LESIONS OF THE LOWER BOWEL

LESIONS *of the* LOWER BOWEL

by

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PREFACE

In the preparation of this volume the author has constantly kept the needs of the clinician in mind Currently many excellent texts are available which deal primarily with anorectal surgical procedures For the most part therefore this phase has been deleted

At the risk of sounding trite I cannot desist from deploring the rather common practice—which is prevalent even among many well trained physicians—of turning first to the radiologist for diagnostic assistance in problems involving the large intestine Actually almost two thirds of all lesions of the entire large intestine occur in the distal part and are therefore more easily diagnosed by proctoscopy (Plate 1) The author has no intention of deprecating the value of roentgenologic studies of the colon but he does maintain that in general roentgenologic studies should be contingent upon the findings made at proctoscopy

Medical diagnosis now attempts to go beyond seeking an explanation for various signs and symptoms Ideally it attempts to make preventive medicine possible by the application of what early diagnosis discloses The distal part of the bowel lends itself well to preventive measures because of its accessibility the simplicity of examining it and the nature of the disease processes that occur in it

Color photography employed as a visual teaching aid is an impressive aid to the diagnosis of intrinsic lesions of the rectum It is difficult to believe that twenty five years ago natural-color photography did not exist and it is even more noteworthy that only within the last decade has endoscopic color photography been accomplished It is true that no one would seriously question the value of this teaching medium but it is also true that the considerable expense of reproducing full natural color in scientific publications has limited its use It is therefore proper to point out that Charles C Thomas Publisher has been most generous and considerate in allotting ample space in this volume for color plates

No matter how vivid one's descriptive powers may be, it is quite impossible to paint accurately a word picture that can convey the clear and ready perception provided by a good color photograph of the object in question. A good example of this can be adduced from the controversial disease chronic ulcerative colitis. In some of the older medical literature on this subject it is not difficult to find instances in which one author would accuse another of being entirely wrong in his description, that the author under attack surely had described some other type of colitis and not chronic ulcerative colitis. It reminds this author of an amusing old jingle that goes like this:

In matters controversial
My perception is quite fine
I can always see both points of view
The one that's wrong — and mine

The graphic medium of color photography has helped to integrate "the wrong point of view" and "mine" not only in chronic ulcerative colitis but in other debatable conditions.

In all diagnostic procedures in which visual interpretation plays the important role that it does in endoscopy of the lower bowel, it is difficult to eliminate prior beliefs and concepts which will unconsciously prevent us from seeing what is actually there. In his book *Your Most Enchanted Listener*, Wendell Johnson brings out a rather humiliating postulate: "we believe what we see because most of what we see is there because of what we believe." One should strive to be entirely objective in recording what one sees.

I wish to express my sincere appreciation to my associate Dr. John R. Hill for preparing the chapter on "Physiology of the Large Intestine." I am particularly grateful to others of the Mayo Clinic: Mr. Louis W. Nichols of the Section of Photography for his many hours of labor on the color transparencies; to Mr. Vincent Destro of the Art Studio for his excellent work on the illustrations; to Dr. J. R. Eckman of the Section of Publications for his guidance and editorial assistance; and to Dr. Joachim H. Wittoesch for his assistance in the preparation of the photomicrographs.

RAYMOND J. JACKMAN, M.D.

FOREWORD

Excellent proctologic textbooks which concern themselves with lesions of the distal segments of the large intestine have been published For the most part however information in them largely emphasizes *relief* of these lesions whether by medical means or by the surgical approach Generally the tendency is to stress the latter The present monograph deals primarily with the *diagnosis* of lesions of the lower bowel The illustrations and particularly the colored ones clearly are so superior as to make any physician proud to be the owner of this volume not to mention the prime advantage of having such salient information available at his elbow so to speak

I have known Dr R J Jackman for a good many years In fact he started his tour of duty at the Mayo Clinic on my service at Saint Marys Hospital Rather early in his career he displayed an investigative mind and the ability to search out the truth His experimental studies with a variety of drugs affecting intestinal motility are known to all He has always manifested an uncommon ability to find out what is unknown and to this he has added the ability of teaching others

With his appointment as head of the Section of Proctology at the Mayo Clinic his investigative spirit has increased This volume is an expression of his desire to transmit to others the vast knowledge and experience that he has accumulated during the many years he has been privileged to examine the distal part of the large intestine

There are three acceptable methods of examining the rectum one with the trained index finger two with the proctoscope and three with the aid of roentgenograms When one views the illustrations accompanying this text there can be little doubt as to which is the most valuable

J Arnold Bargen M D

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Chapter I

ANATOMY

It is not the purpose of this chapter to recapitulate obvious anatomic data Rather it is the desire of the author to present only those features of pelvic anatomy which will help to orient the clinician in arriving at a satisfactory diagnosis In presenting this chapter I wish to acknowledge the help of Dr W Henry Hollinshead of whose writings and counsel this writer has borrowed heavily

The anatomy of the terminal portion of the bowel will be presented under three headings (1) internal anatomy (2) intra mural anatomy and (3) external anatomy A short description of the relationships of this part of the bowel also will be presented

INTERNAL ANATOMY

Certain landmarks and structures can be identified by digital and proctoscopic examination Only those anatomic structures that can be seen or palpated will be discussed

The Anorectal Junction —Much confusion exists in medical writing in regard to the boundaries of the anal canal From a clinical standpoint we propose to use the mucocutaneous junction as the upper limit of the anal canal The reason for this is that this junction usually is readily identified at proctoscopic examination There is an abrupt change from the white anal skin to the pink or red rectal mucosa Other synonyms for the mucocutaneous junction are the pectinate line linea dentata or dentate line

The Anal Canal —Depending on how the anal canal is defined it varies considerably in length but according to our definition of the upper limit the canal is relatively short (that is a half inch more or less)

The Anal Verge —The lower limit of the anal canal spoken of as the anal verge (Fig 1) is difficult to define exactly It

consists of the sloping transition between the dry perianal skin provided with hairs and sweat glands and the moist hairless and almost glandless lining of the anal canal itself

Epithelium of the Anal Canal —The anal canal is lined by a modified stratified squamous epithelium which is distinguished from the perianal skin by the fact that it is glabrous meaning that hair follicles are lacking and that sweat glands are few or absent Moreover the epithelium of the anal canal is less cornified *The squamous epithelium for all practical purposes extends up* to the pectinate line and then ceases abruptly giving way to a stratified columnar or cuboidal epithelium Hollinshead points *out that although this may be true in the fetus and newborn the* upper border of the stratified squamous epithelium extends progressively upward with advancing age and therefore has no fixed relationship to other landmarks in the anal canal However from a clinical standpoint if one thinks of an abrupt transition at the dentate margin confusion is less likely to occur

The Intermuscular Groove (Fig 1) — A groove or annular depression corresponding to the lower border of the internal sphincter and the superficial part of the external sphincter is palpable This groove is situated below the dentate margin and according to most writers at the same level as the white line of Hilton and also the pecten Usually it can be palpated at digital examination but as a rule it cannot be visualized

The Rectal Columns (Fig 1) —Since we are considering the proximal end of the anal canal and the distal end of the rectum to be at the pectinate line we speak of these longitudinal folds of mucosa as *rectal columns* rather than as anal columns (columns of Morgagni) The columns will vary from five to ten They are about 1 cm long and 3 to 6 mm wide at their bases They begin inconspicuously and become wider and higher as they are traced downward until they are united by thin folds of skin the anal valves (Fig 1)

The Anal Valves — Therefore it is this line of the upper border of the anal valves consisting alternately of the valve border and the base of a rectal column which constitutes the dentate line the pectinate line or the anorectal junction

Internal Appearance of the Rectum Valves of Houston —Per

manent sickle shaped horizontal folds consisting of mucosa sub mucosa and circular muscle project into the rectal lumen These are called the rectal folds or valves of Houston (Fig 1) and when well developed they give the distended rectum a zigzag shape Generally there are three of these rectal folds the highest one on the left a middle one on the right and the lowest one on the left There may be two or four of these folds and they may be differently placed

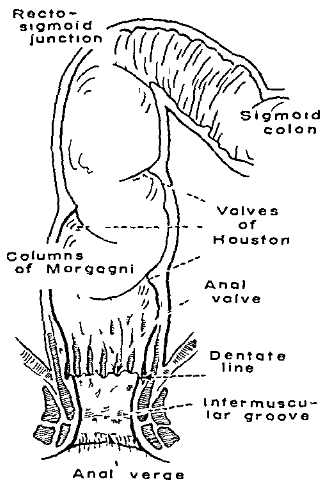


Fig 1 Internal anatomy of the terminal portion of the bowel

Rectum —The proximal end of the rectum (Fig 1) begins at the rectosigmoid juncture (to be discussed subsequently) As the proximal end of the rectum descends it is wider than the tapering

lower part of the sacrum and the coccyx and its posterior part rests therefore on the musculofascial walls of the pelvis until beyond the tip of the coccyx it is entirely supported posteriorly and inferiorly by the levator ani muscles

The Ampulla of the Rectum —That lower portion of the rectum which has the greatest diameter and which rests on the levator ani muscles is called the ampulla of the rectum The ampulla is constricted abruptly where the rectum penetrates the pelvic floor and the level of this constriction is what Hollinshead and most anatomists consider the logical plane of division between the anus and rectum

Length and Diameter of the Rectum —These vary greatly in adult persons The length will be 12 to 15 cm

In carrying out proctoscopic examination with a proctoscope that is calibrated on the side in centimeters I have made it a point to observe how far the proctoscope was inserted when the proximal end was at the rectosigmoid the reading on the instrument being taken at the anal verge Admittedly the rectosigmoid is an imperfect landmark but it was interesting to note that in a few large obese patients the entire length of a proctoscope 25 cm long would be completely inserted to the flange with the proximal end of the instrument being at what was interpreted as being the rectosigmoid juncture In small persons or infants the reading at the anal verge often would be 8 or 9 cm The foregoing patients of course are exceptional but they do serve to illustrate the wide variation in the length of the rectum The average reading from the anal verge to the rectosigmoid was 15 cm

Rectosigmoid Junction Anatomic and Internal Landmarks (Fig 1) —Although there are several *anatomic landmarks* such as the level of the third sacral vertebra where the colon loses its mesentery or where the superior hemorrhoidal artery descending into the pelvic mesocolon divides into right and left branches *there is no internal landmark that will tell the proctoscopist what the upper end of the rectum is or what the distal end of the sigmoid is* At best the rectosigmoid junction is a rather indefinite site but sometimes it can be identified proctoscopically by one or more of the following findings First it is the point at which the

upper part of the rectum becomes constricted

Second it is the point at which the upper part of the rectum turns anteriorly

Third smooth rectal mucosa becomes rugose as the sigmoid is entered but on the basis of my observations the rugose appearance at the rectosigmoid junction is noted proctoscopically in only about 50 per cent of patients Hollinshead quoted Martin and Burden as noting in the cadaver that there was an abrupt transition between the smooth rectal mucosa and the rugose sigmoid mucosa in twelve of thirty-one specimens and that in the remainder the change was gradual

Fourth the uppermost Houston valve has been said to mark the rectosigmoid junction but most writers on the subject agree that even in extreme anatomic variations this valve is situated considerably distal to any of the other foregoing three criteria

For other than descriptive purposes exactly what constitutes the rectosigmoid junction is of no real practical importance Actually when the location of a lesion in the rectum is to be described it probably is more nearly scientific and accurate to do so in terms of centimeters above the anal verge or to describe the location in its relationship to the dentate margin

The Sigmoid Colon Distinctive Features (Fig 1)—There are three rather inconsistent features of the sigmoid colon that help to distinguish it from the rectum (1) the rugose appearance of the mucosa which already has been discussed (2) the fact that the caliber of the lumen is considerably less than that of the rectal lumen and (3) the fact that the mobility is usually great This latter feature is determined by the length of the mesocolon As a rule haustrations or sacculations are present in the lower part of the sigmoid

INTRAMURAL ANATOMY

The wall of the large intestine is made up of mucosa submucosa muscularis and serosa

Peritoneal Relationships of the Lower Bowel—The sigmoid colon and its mesentery descending into the pelvis on the left side approach the midline At the same time the mesentery becomes shorter and disappears entirely at the level of the third

sacral segment so that the posterior surface of the rectum is in direct contact with general connective tissue and only the sides and front are covered with peritoneum In the female at the lower limit of the pouch of Douglas the serosa on the anterior part of the rectum is reflected onto the posterior surface of the uterus in the male the serosa is reflected onto the bladder Below this point there is no serosal covering (Fig 2)



Fig 2 Peritoneal reflections in the male and female

Musculature of the Lower Bowel—There are two layers of muscle in the wall of the rectum an inner circular layer and an outer longitudinal layer In the wall of the anal canal the circular muscle thickens ending just above the anal verge and below the dentate margin This thickening is the internal sphincter of the anus

The taeniae and haustrations of most of the large intestine begin to lose their identity in the vicinity of the upper part of the rectum which is now covered by a continuous layer of longitudinally arranged smooth muscle These fibers continue to the wall of the anal canal separating the voluntary from the involuntary anal muscles and attaching in part at least to the intersphincteric line (Hilton s white line)

Lymphatic Supply—A brief description of the lymphatic drainage is important from a clinical standpoint because of the frequent occurrence of malignant lesions in this area In general the lymphatic plexus above the dentate line is drained within the pelvis while the lymphatic network in the anal wall itself (that is distal to the dentate margin) goes to the superficial inguinal nodes Nesselrod has demonstrated that there is some communication across the pectinate line and as Hollinshead has pointed out this communication is of considerable clinical significance in the

retrograde spread of adenocarcinoma of the rectum and in the proximal spread of cancers of the anal skin

In general the main lymphatic drainage above the pectinate line is upward but there are channels which go laterally both below and above the levator muscles Although the retrograde spread of rectal adenocarcinoma is possible it rarely happens and when it does it presumably takes place only when there is considerable blockage of the lymph channels leading upward

Nerve Supply of the Lower Bowel—The anal canal up to the dentate margin has a liberal supply of sensory nerves Because of this liberal supply of somatic nerves small seemingly insignificant anal lesions frequently will cause exquisite pain with subjective symptoms out of all proportion to the objective findings

The rectum has a double nerve supply sympathetic and parasympathetic The functional importance of the sympathetic nerve supply is not clearly understood but sympathectomy has not been shown to interfere with the sensation of filling of the rectum nor is the operation regarded as efficacious in the relief of rectal pain The parasympathetic nerve supply to the rectum arises from the nervi erigentes (anterior rami of the sacral nerves soon after emergence from the anterior sacral foramina) Most of the colon including the descending portion receives its parasympathetic supply from the vagus nerves but the distal end of the bowel derives its supply from the sacral nerves Auerbach s plexuses contain the ganglia of the parasympathetic nerve supply of the bowel These ganglion cells are responsible for the integration of the peristaltic reflex into an orderly relaxation contraction cycle progressing down the bowel When Auerbach s plexuses are absent from a segment of the wall of the bowel that segment becomes spastic and narrowed causing partial obstruction and sometimes secondarily congenital megacolon

Blood Supply and Venous Return—For a detailed description of these features the reader is referred to Hollinshead s *Anatomy for Surgeons* We are principally concerned here with venous return because this action has to do with the spread of infection and malignancy

Hollinshead points out that although the pectinate line frequently has been compared to a watershed dividing arterial

venous and lymphatic supply into two portions the comparison is more nearly true of lymphatic drainage than it is of arterial and venous supply because there is free anastomosis across the pectinate line between the inferior and middle hemorrhoidal arteries as well as veins There is thus no really sharp division of the arterial and venous supply at this site

According to Reuther, the middle and inferior hemorrhoidal veins emptying into the caval system normally are well protected by *competent valves so placed as to direct the blood away from* the gut Since there are no valves in the veins of the submucous plexus communicating with each other both internal and external hemorrhoids may result from portal obstruction

It has been this author's repeated observation that patients who have portal obstruction and cirrhosis of the liver tend to have an abundance of hemorrhoidal tissue and often large rectal varices situated well above the internal hemorrhoidal zone

EXTERNAL ANATOMY

The relationship of the lower bowel to adjacent pelvic structures and spaces is important from the standpoint of extrarectal tumors and inflammatory processes

Spaces Associated With the Rectum—Hollinshead describes two potential fascial *spaces associated with the rectum* one lying between the rectal fascia and the outer longitudinal muscle coat of the rectum and the second surrounding the rectal fascia and *consisting of loose connective tissue* Both these spaces completely surround the lower part of the rectum and the sides and posterior surface of the upper part

Pararectal Space—This space has been designated the para rectal and perirectal respectively but since the rectal fascia is no barrier to infection the two spaces often are referred to as being one (that is the pararectal space) (Fig 3)

The boundaries of this space would therefore be posteriorly laterally and below the walls and floor (levators ani and coccygeal muscles) of the pelvis It is limited above by the peritoneal reflection and anteriorly by the vagina prostate or seminal vesicles It contains loose connective tissue

Supradiaphragmatic Spaces and Retrorectal Spaces—Nesselrod

refers to this as the *supradiaphragmatic spaces* (meaning above the pelvic diaphragm and levator ani muscles) and divides it into the *retrorectal space* (Fig 3) and two pelvirectal spaces The retrorectal space is limited laterally by the rectal stalks It is bounded anteriorly by the rectum and posteriorly by the sacrum

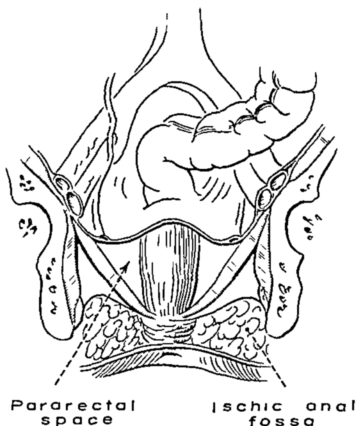


Fig 3 Boundaries of the pararectal or supradiaphragmatic space as well as ischioanal fossa

It extends upward or proximally to a point at which the peritoneum is reflected onto the rectum (that is at about the junction of the second and third sacral segments) Below or distally the levator ani and coccygeal muscles form the floor The space contains branches of the sacral plexus as well as branches of the sympathetic plexus It also contains the middle sacral ileolumbar and middle hemorrhoidal vessels and lymphatic vessels

Pelvirectal Space—*The pelvirectal space* is bounded medially by the rectum superiorly by the pelvic peritoneum posteriorly by the rectal stalks and inferiorly by the pelvic diaphragm This space sometimes is spoken of as the superior levator fossa

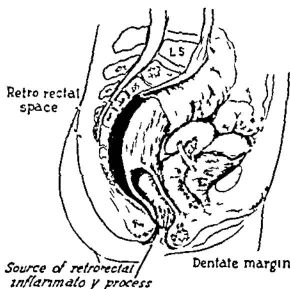


Fig 4 Boundaries of the retrorectal space (*Reproduced with permission of the publishers from* Jackman R J Clark L I and Smith N D Retrorectal Tumors *J A.M A* 145 956-961 [Mar 31] 1951)

Ischioanal Fossas—The two spaces below the diaphragm known as the ischioanal fossas (one on either side of the anus) are bounded above by the pelvic diaphragm medially by the wall of *the anal canal (that is distal to the intersphincteric* sulcus at which point the levator muscles insert) and are bounded below by the skin of the buttocks and laterally by the fascia overlying the internal obturator muscle

RELATIONSHIPS OF THE LOWER BOWEL

As will be shown subsequently the lower bowel by means of digital and proctoscopic examination lends itself well to investigation of adjacent structures

In the Male*—*In the male (Fig 5) from below upward on the anterior wall just inside the anal canal in the lower part of the

rectum is the prostate gland The prostate gland is so to speak collared around the neck of the bladder and the membranous urethra The base is upward adjacent to the bladder and the apex is distal or inferior Usually the prostate gland can be palpated without any difficulty Above the prostate gland on either side extending upward and laterally between the anterior rectal wall and the posterior wall of the bladder are the seminal vesicles It has been said that normally these structures cannot be palpated and that only if seminal vesiculitis is present can they be felt by digital examination Above the prostate gland and between the seminal vesicles is the posterior wall of the bladder the lower part of which is not covered by peritoneum

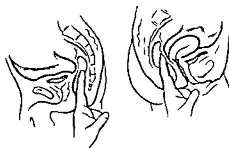


Fig 5 External relationships of the lower bowel in the male and the female and approximate zone of digital exploration of the rectum

One of the best methods of examining a male to determine if the bladder is distended is the bimanual examination This is done with the patient in the lithotomy position the examiner palpates the bladder with one hand over the lower part of the abdomen of the patient and the index finger of the other hand in the rectum of the patient Although the level of the peritoneum varies considerably depending on the degree of muscularity and nourishment it can be said to reflect from the anterior rectal wall onto the posterior wall of the bladder (rectovesical pouch) at about the tip of the finger when digital examination of the rectum is carried out without an attempt to palpate as high as possible Because this rectovesical pouch is the most dependent part of the

abdomen it is the site at which many extrinsic processes present themselves by variable means

In the Female—*In the female* (Fig 5) *anteriorly from below upward* is the vagina uterus and adnexa The peritoneum reflects onto the posterior wall of the vagina (that is about a finger s length inside) creating the cul-de sac of Douglas Probably more so than the rectovesical pouch in the male this cul-de sac is a focal point at which many intra abdominal and intrapelvic diseases are mirrored As Nesselrod has pointed out a vaginal approach sometimes can be advantageous in breaking up a fecal impaction Bidigital examination of the rectovaginal septum frequently is helpful in diagnosing endometriosis or inflammatory processes in this area

Posterior Relationships—Posterior to the rectum is the retrorectal space which often can be the location for a variety of inflammatory conditions and congenital and acquired tumors Actually of course it is a potential rather than a real space

Lateral Relationships—On each side of the rectum is the pararectal space or as designated by some the pelvirectal space which when involved by abscess formation will bulge into the rectum The pararectal space already has been described in this chapter

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Chapter II

PHYSIOLOGY OF THE LARGE INTESTINE

JOHN R HILL

The large intestine although it is not essential to life plays an important contributing role in the health and welfare of any person That the large intestine is not indispensable has been proved by the fact that many people are able to lead a reasonably normal existence after complete removal of the colon and rectum nonetheless it cannot be denied that they live under a serious handicap To sacrifice the colon for unjustifiable cause as was done in the past for what was called stasis could according to Ogilvie be considered among the more discreditable adventures of surgery

FUNCTIONS OF THE LARGE INTESTINE

The large intestine of the human being has several functions It serves as a reservoir for the waste products of food it has the power of absorption its lining secretes mucus and there is some evidence that the large bowel may serve as an excretory organ As Bockus has said The major function of the mammalian colon is to render the waste products of digestion fit for elimination in a form and at a time causing the least inconvenience to the animal This is accomplished in three ways (1) Water is withdrawn through the bowel wall from the fluid chyme which enters the cecum from the terminal ileum (2) The formed fecal mass is then stored so that the act of defecation needs to be performed on an average of once daily (3) Finally by a well-coordinated series of nervous impulses and muscular activity the colon expels the excreta in a clean and efficient manner

***Absorption** Water* —In the normal person during each twenty four hours approximately 400 gm of fluid material consisting

approximately of 90 per cent water (most of the remainder being unabsorbed products of digestion as well as indigestible material, principally cellulose) passes from the ileum into the cecum. In an equal period about 150 gm. of feces is evacuated. The loss of 250 gm. in weight is due mainly, if not entirely, to absorption of water; *in fact, the loss of water may even be greater than the* figure indicated, for the fecal mass is increased as it progresses along the colon, primarily by the addition of bacteria, mucus and desquamated epithelial cells. The absorption of water takes place in all parts of the large intestine, but the right portion of the colon is principally concerned with this function, and by the time the transverse colon is reached, the contents of the bowel *have become a semisolid mass. Additional dehydration of the* fecal mass takes place as the mass progresses from the transverse colon toward the anus, mainly during the time it is stored in the sigmoid. It seems reasonable that in some cases constipation could result from too efficient absorption of water by the colon; moreover, it might be that a colon relatively deficient in the function of absorption could be the cause of loose stools and possibly even diarrhea.

Salt, Sugars and Medications.—In addition to its capacity for conserving the body's water by passing it back into the blood stream, the large intestine is capable of absorbing other substances. Chief among these substances are sodium chloride, dextrose, sucrose and numerous medications. The administration of water, sodium chloride and dextrose by proctoclysis, frequently applied *in the past, has been largely discontinued today in* favor of the more efficient intravenous method of giving these substances. There is one situation—after the performance of ureterosigmoidostomy—in which the ability of the colon to absorb chlorides is detrimental. In such an instance, reabsorption into the blood stream of the urinary *chlorides results in hyperchloremia* and acidosis.[67]

Toxins.—In the not too-distant past (as late as thirty years ago) it was felt by some physicians that the absorption of toxic substances into the blood stream from the colon could result in various constitutional disorders, and *colectomy was carried out* many times for so-called *chronic stasis*. Although certain charlatans

notably the promoters of colonic irrigations, still are able to make a living off the gullible public by preaching that a "clean" colon is essential to health. No reputable physician subscribes to the viewpoint that toxins are absorbed from the colon (at least not to an extent sufficient to cause any of the many symptoms which are thought by laymen to be the result thereof). The products of the bacterial decomposition of proteins, of which the common ones are indole, skatole, phenol, cresol and hydrogen sulfide, may be absorbed in small quantities but are detoxified by the liver.[2] Thus, in discussing the subject of constipation with a patient, the physician can safely assure his patient that his "sluggish bowel" is in no way a menace to his general health. Again, Ogilvie has stated aptly, "We hold that the only people who are harmed by constipation are those who believe the advertisements and develop a laxatory neurosis."

Secretion of Mucus.—The only known secretory function of the large intestine of any importance is the production of mucus, the chief actions of which are to protect the mucosa from trauma and to lubricate the fecal mass.

Causes and Significance of Hypersecretion of Mucus.—Many patients complain of passing mucus in the stool. This sign in most instances at least simply indicates that an increased amount of this substance is being produced in the colon or rectum or both. There can be numerous reasons for this increased production of mucus, most of which are inconsequential. In the first place the intestinal glands which secrete mucus are under nervous control, and any overstimulation such as may be caused by mental anxiety and tension will result in oversecretion. The nervous factor plus that of addiction to the use of laxative agents and enemas undoubtedly are the most frequent causes of increased production of mucus in the large intestine. Proctologists know that the use of prepared enemas (containing sodium biphosphate and sodium phosphate with hydrogen peroxide as a preservative) in the cleansing of the terminal part of the bowel for proctoscopy also results in the secretion of excessive amounts of mucus. It is probable that any chemical or mechanical irritant will produce a similar result, as will inflammation of the colonic or rectal mucous membrane.

In the author's experience there is only one pathologic lesion in which passage of an excessive amount of mucus from the rectum is of diagnostic significance and that lesion is the villous tumor. When this type of tumor becomes bulky as it has a tendency to do it secretes a large amount of mucus. Sometimes a patient who has such a tumor complains only of the frequent passing of mucus per anus.

Excretion.—Not much is known about the excretory powers of the large intestine but it is not believed that excretion is an important function of this part of the bowel. Alvarez wrote that the colon perhaps serves as an excretory organ for certain substances such as the salts of the heavy metals. According to Bockus there is very little evidence of the excretion of minerals through the colon but he added that tetra bismuth tartrate is excreted by the colonic mucosa and that even arsenic is excreted by the lining of the rectum.

Production of Gas.—According to Best and Taylor the volume of gas contained in the human gastro intestinal tract under ordinary conditions has been estimated at about 1 000 cc. It is composed of carbon dioxide (23 per cent) nitrogen (21 per cent) oxygen hydrogen and methane. The reasons for increased amounts of gas in the large intestine probably are many which will not be considered here. Aside from obstruction of the lumen of the colon or rectum the proctologist has two main causes for interest in the complaint of gaseousness: (1) no promise can be made to abolish this condition even if a patient's bowel habits can be returned to normal and (2) in the treatment of lesions of the colon or rectum by fulguration explosions can be caused by ignition of the hydrogen and methane components of the gas.

Movements of the Large Intestine.—Compared to the small intestine the colon is a sluggish organ. Alvarez wrote that much of the progress of material in it seems to be due to the pressure exerted by new material coming down from above. Except during the act of defecation the proximal segments of the colon exhibit greater tone and a higher rate of rhythmical contraction than do the distal segments.

Nerve Supply.—The colon and rectum have a dual nerve supply parasympathetic and sympathetic. It is generally agreed that the

parasympathetic supply (the terminal fibers of which connect with the ganglion cells in Auerbach's plexuses) has a stimulating effect upon the movements of the colon and rectum and an inhibiting effect upon the ileocecal and internal anal sphincters According to Hollinshead the functional importance of the sympathetic is not clearly understood but theoretically at least it is inhibitory to the movements of the colon and rectum and stimulating to the ileocecal and internal anal sphincters There is no general accord on the question of the exact origin of the parasympathetic supply but it is the viewpoint of most authors that the cecum ascending colon and proximal portion of the transverse colon are supplied by the vagus nerves while the remainder of the colon and the rectum are supplied by the anterior rami of the second third and fourth sacral nerves by way of the nervi erigentes The sympathetic nerve supply to the colon and rectum has its origin in the lumbar segments of the spinal cord

Types of Motor Activity —For the following information on the motor activity of the colon I am much indebted to the paper of Code Wilkinson and Sauer and to Dr Code for information gained by personal communication The conclusions of these men are based principally upon experimental work which concerned the pelvic portion of the colon and which revealed four types of recordable waves which indicate motor activity of this part of the intestine

Type 1 waves are small simple waves which when present (only about 1 per cent of the time) occur at the rate of about thirteen per minute The function of type 1 waves is not known but the authors mentioned suggest the possibility that they are the results of contractions of the muscularis mucosa Type 1 waves are not propulsive

Type 2 waves also are simple waves but they are of greater duration and amplitude than are type 1 waves In the pelvic colon the duration of type 2 waves commonly is a third to a half minute and when they occur in rhythmic sequence the frequency is almost exactly two per minute They are the main type of wave in the colons of normal persons probably represent haustral contractions and may aid in absorption by their part

by contraction of the external anal sphincter. If evacuation is postponed too long, the stimulus to defecate may be lost because of loss of tone of the rectal musculature (Bockus) and may not return until the rectum is further distended by the arrival into it of more feces. *However, I have observed that if defecation is attempted too early—that is, before the rectum is sufficiently distended—there is a tendency for incomplete evacuation of the rectal contents to occur.*

Defecation Centers.—According to Alvarez (who quoted Hatcher and Weiss), there appears to be a defecation center in the medulla of the brain. It is situated close to the vomiting center. He postulated that this center may have something to do with the voluntary starting of defecation and with the incontinence that comes with fright, arteriosclerotic senility, epilepsy, and other diseases in which the brain is damaged.

The reflex center of defecation is in the sacral part of the spinal cord. Under normal conditions the emptying reflex is under voluntary control, *but it is not known whether this is due entirely* to voluntary contraction of the external sphincter or a more complicated mechanism (Hollinshead). Lesions or injuries of the spinal cord above the sacral area result in less disturbance of the process of defecation than do lesions of the sacral part of the cord or the cauda equina. When lesions occur in the former area, reflex contraction of the external sphincter still remains. When trauma is sustained in the latter sites, both voluntary and reflex action of this muscle is destroyed, as is the parasympathetic supply to the rectum.

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Chapter III

TECHNIC OF PROCTOSCOPY

DEFINITION

Strictly speaking the word "proctoscopy" denotes visual examination of the rectum. Actually, however, as a result of common usage and as the word will be used in this treatise, proctoscopy implies visual inspection of the perianal and anal areas, palpation by digital examination of the perianal area, anus and rectum, and visual examination of the anus, rectum, rectosigmoid and variable amount of the sigmoid colon. Therefore, synonyms for proctoscopy, as the word will be used here, are "proctosigmoidoscopy" and "sigmoidoscopy." Obviously, sigmoidoscopic examination rarely would be conducted without proctoscopic examination as well. Strictly speaking, only if the patient had undergone sigmoidostomy would it be possible to do sigmoidoscopy.

INDICATIONS FOR PROCTOSCOPY

In general, the *indications for proctoscopy* are comprised in three main headings:

1. The examination is indicated when there is a history of any symptoms relative to the lower part of the large bowel, such as bleeding, pain, constipation, diarrhea and so on.

2. Such an examination is indicated when any abnormal pathologic process is palpated at digital examination of the anus and rectum.

3. Proctoscopy is indicated as part of the annual routine physical examination of members of the older age groups for the detection and possible prevention or eradication of cancer (see Chapter X).

DIAGNOSTIC PROCEDURES APPLICABLE TO THE COLON

After the history has been taken and the physical examination

has been conducted diagnostic procedures applicable to the colon would be examination of the stools and proctoscopic examination and roentgenologic study of the colon—in that sequence The nature of the history and the physical findings will determine whether or not all of the tests just mentioned are indicated Results of examination of the stools may be sufficiently revealing to obviate the necessity of a proctoscopic examination or again what is disclosed at proctoscopic examination may preclude the necessity of a roentgenogram of the colon In other words whether or not a roentgenogram of the colon is made should be determined by the results of other procedures such as proctoscopy which would logically precede the roentgenologic procedure

PREPARATION OF THE PATIENT

Some proctologists prefer to examine the patient without any cleansing of the lower bowel They contend that they can learn something about the patient s problem by the character of the stool and by the factor of whether or not the bowel has been completely emptied at defecation They contend that a soapsuds enema might set up a hyperemia which would be difficult to distinguish from an organic inflammatory process Nonetheless even though it may be possible on occasions to carry out a satisfactory proctoscopic examination of some patients within a couple of hours after defecation it is still true that many times enough stool remains in the lower bowel to prevent satisfactory visualization

Patient With Anal Continence—Such a patient is advised to take one or more enemas of plain warm water or soapsuds or to continue to take enemas until the water returns reasonably clear This procedure should be done at some time within two hours preceding the examination Fasting preceding the examination is unnecessary Catharsis or purgation during the preceding twelve hours is to be avoided because it causes the bowel to become more irritable and also because it usually causes liquid or soft stools to remain in the lower bowel Prepared enemas of sodium biphosphate or sodium phosphate or both have proved satisfactory in preparation of the lower bowel for proctoscopy If a patient comes to the office without preparation as described or

bowel must be ruled out Bleeding from a polyp or neoplasm usually is mixed with the stool and also is bright red Patients with chronic ulcerative colitis or most other inflammatory processes usually will have variable degrees of diarrhea associated with the bloody discharges In early chronic ulcerative colitis a good history may be invaluable because many patients in whom the inflammatory process involves only the distal part of the rectum will give a history of constipation but on closer questioning also will tell of an occasional bloody discharge without the passage of stool It is this type of patient who is sometimes unwittingly operated upon for some supposed anal pathologic process with the result that the wound may heal slowly if at all and the colitis may flare up again

The question of anal pain similarly should be elaborated on Pain made worse by defecation generally is anal in origin as distinguished from high rectal pain that is aggravated by sitting or that extends down the legs This will be discussed in more detail in Chapter XXIII which has to do with anorectal pain

It is important to know whether rectal treatment has been administered previously because certain types of media used in the injection treatment of hemorrhoids may produce an intramural tumor mass (oleoma) which may be confused with other tumor masses Again one of the commonest methods of treating anal pruritus is the use of roentgen rays and if such treatment has been administered that fact should be recorded in the proctologic history If it is not and additional roentgen rays are employed the patient may be given an overdose with the dangers inherent in such an action

The circle at the right of the proctoscopic sheet (Fig 7) is provided for diagramming anal ulcers or enlarged anal papillae

The lower part of the sheet is for the report of the examination

POSITIONS OF THE PATIENT FOR PROCTOSCOPY

There are essentially three positions in which the patient may be placed for proctoscopic examination The first is the left Sims position (Fig 8) the second is the knee-chest position (Fig 8) and the third is the inverted position (Fig 9 10 and 11)

Left Sims Position —Use of this position is advantageous if a patient is so ill that the knee-chest position or inverted position cannot be used Some physicians prefer to do all their proctoscopic examinations with the patient in this position because patients regard it as a posture that is less humiliating Yet in my opinion satisfactory visualization is more difficult when the left Sims position is used Moreover this position may cause more discomfort to the patient because the bowel frequently has to be inflated with air in order to pass the proctoscope If the left Sims position is used the examination will be greatly facilitated if the patient is properly placed as in figure 8A Notice that the hips of the

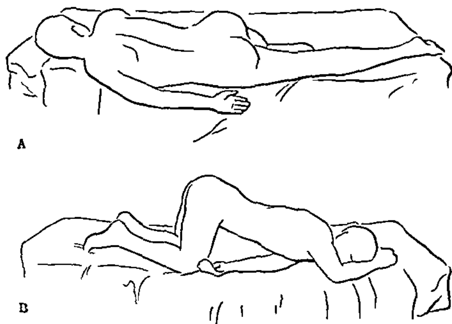


Fig 8 A The left Sims position B The knee chest position

patient are at the edge of the bed or examining table The left leg is extended The right knee is flexed and the right thigh is drawn well up The left arm is brought back of the patient thus permitting the chest to touch the examining table The hips are in a vertical line The patient is instructed to sway the back and to allow the abdominal muscles to relax If the patient is thus placed

the bowel tends to fall away from the pelvis as in the knee-chest or inverted position thus facilitating the examination

Knee chest Position —This position can be used as a substitute for the inverted position if a satisfactory proctoscopic table is not available Here again the procedure will be less difficult if the patient is properly placed (Fig 8B) Notice that the thighs

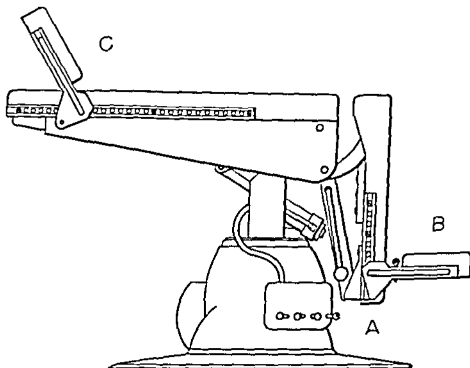


Fig 9 Electrically powered proctoscopic examining table A Foot pedals for tilting, raising or lowering the table B Adjustable knee rest C Adjustable head rest

are almost vertical and that the left arm is placed beneath the patient to bring the chest closer to the examining table The back is swayed and the abdominal muscles are relaxed thus permitting the bowel to drop away from the pelvis thereby overcoming the resistance of the abdominal muscles as the proctoscope is inserted

Inverted Position —When this position is used the patient lies on a standard proctoscopic examining table of which there are many modifications However the basic principle of all is the

same The ideal feature of any proctoscopic table is the ease with which it can be simply adjusted to fit the needs of both the patient and the examiner (Fig 9) The arm and head rest can be moved the knee rest can be raised or lowered and the height of the table can be changed as desired When the patient is inverted it is important that the abdomen hang free without pressure and that muscle resistance be eliminated (Fig 10)

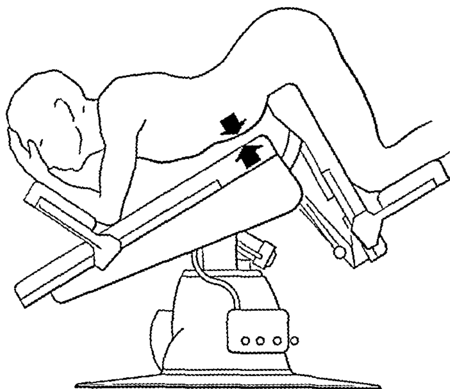


Fig 10 Correct position of the patient when the table is inverted The abdominal wall is relaxed and ideally does not touch the table surface

In any of the above-described positions it is desirable that the patient be suitably draped and that a nurse be in attendance

The inverted position also can be used in the office or hospital by draping the patient over the side of a bed or an examining table (Fig 11)

An instrument never should be inserted into the anal canal until digital examination has been done or attempted. The reason for this is apparent. Only by digital examination can the examiner learn whether or not it is feasible to use the standard caliber of proctoscope which usually is about *the size of the average index finger* or 5/8 of an inch in diameter. If there is a painful anal lesion which causes *anal muscle spasm, use of a smaller caliber proctoscope* might be indicated with some form of topical anesthesia *such as pramoxine hydrochloride* (tronothane hydrochloride). The technic of examination of the patient who has an anal stricture or painful anal lesions will be discussed subsequently.

***Introduction of the Proctoscope*.**—After the digital examination the assisting nurse hands the proctoscope to the physician who grasps it firmly in his right hand as shown in Figure 12, left, and makes sure that the obturator is held firmly in position by the thumb. Lubricant is placed on the anus and here again *before the proctoscope is introduced* the examiner explains to the patient what is to follow: "Now I am going to insert an instrument into the rectum; this instrument is the same size as my finger. If you will try not to resist it by tightening the muscles it will cause you very little discomfort. Let your back sag down and the abdominal muscles loosen, and continue to breathe slowly in and out through the mouth."

The examiner then continues to hold the proctoscope firmly in the right hand and keeps in mind the angle of relationship between the direction of the anal canal and the direction of the rectum. The proctoscope is aimed in about the direction of the umbilicus and is introduced through the anus. After the resistance presented by the anus is passed, the examiner transfers the proctoscope to the left hand (Fig. 12) and removes the obturator with the right hand and puts it aside. The examiner effects maneuvering and passage of the proctoscope by continuing to hold the flange in his left hand, thus leaving his right hand free to use the suction apparatus, biopsy forceps, fulguration applicator or other procedures which will be described subsequently.

***Advancing the Proctoscope*.**—From now on the proctoscope is advanced by direct visualization, meaning that the lumen ahead actually is seen or that a clue to the lumen is seen. As soon as the

obturator has been withdrawn the rectal lumen *will* usually balloon open as a result of atmospheric pressure if the examiner has his patient well under control and co operating Generally there is no difficulty in *advancing the proctoscope* to the upper part of the rectum or the rectosigmoidal area where the bowel tends to become narrowed and to turn anteriorly or to the right or left

When the proctoscope has been advanced to this point the examiner anticipates what his patient is experiencing or about to experience by saying *Now I realize that you have a sensation of fullness which seems like the impulse to defecation but it is only because the instrument is in the rectum Your bowel is well prepared Even though you may have a desire to tighten your muscles try not to do so and you will have less discomfort Continue to breathe slowly in and out through the mouth*

Blind Alley —It has been my experience that a most difficult fact to teach our graduate students is that *the proctoscope can always be reinserted as far as it has once been advanced*—that it is usually necessary to withdraw it to determine from what direction a fold of bowel appears (Fig 13) I presume the thinking of most of those new to the conduct of a proctoscopic examination is that the instrument must not be withdrawn lest valuable ground be lost so to speak This withdrawal when the proctoscope

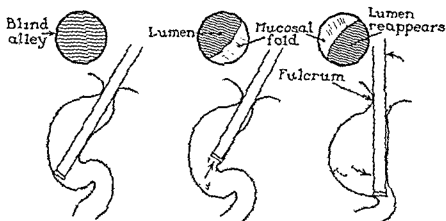


Fig 13 The technic of advancing the proctoscope when the instrument seemingly is in a blind alley The maneuvering depicted here generally will bring the lumen back into direct view

seems to be in a "blind alley" may have to be as much as 5 or 6 cm After the fold of bowel appears in the lumen of the proctoscope the instrument is advanced again just beyond the fold which is then pushed out of the way With the anus as a semifixed fulcrum the proctoscope is angled in the same direction as that from which the fold appeared until the lumen of the bowel is seen ahead again

As the proctoscope is advanced into the lower part of the sigmoid the patient experiences variable degrees of cramp or distress which probably can best be described in the words "It feels as if I'm going to burst" Hence the examiner reassures his patient as follows "Yes I realize you are having some distress in your lower abdomen but the examination will soon be over and it is important for you to try not to protect yourself by tightening your muscles"

Use of the Bellows —Most of the detailed examination is carried out as the proctoscope is withdrawn The use of the bellows to inflate the bowel is now permissible but inflation should be used cautiously because it will only add to the patient's distress Actually inflation of the bowel with air to aid in passing the proctoscope is of little value it causes the patient more distress and can convert a co-operative patient into a tense apprehensive one who fears that he is going to have a bowel movement

After the instrument has been inserted the full distance the patient is reassured in some such manner as this "Now I am going to take the instrument out This might make you feel as if your bowels are moving but this will not happen it is only the sensation you have"

When the instrument has been removed the examiner may wish to examine the anus and lower part of the rectum in more detail with an anoscope This procedure will be described subsequently

Gentleness and consideration for the patient's anxieties are of utmost importance to successful completion of the proctoscopic examination More so than is true of most clinical examinations complete co-operation of the patient is absolutely necessary to effective proctoscopy

If one of the main rectal complaints is protrusion at the time of defecation it probably is advisable to have the patient strain

down while seated on the toilet and to examine him while he is in the squatting position Frequently it will be found that the degree of protrusion is out of proportion to the patient s statement

Technic of the Teaching of Proctoscopy —In teaching our graduate students the technic of proctoscopic examination we use two auxiliary aids The first is a model of a sagittal section of the pelvis (Fig 14A) This model is mounted in a wooden frame and to permit flexibility *in maneuvering the proctoscope* the lower part of the simulated bowel is lined with foam rubber

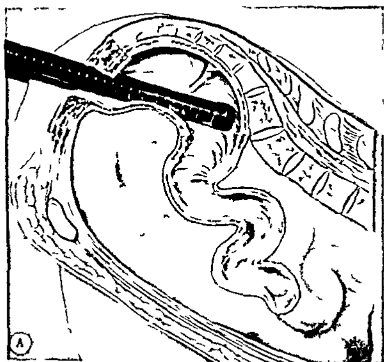


Fig 14 A Sagittal section of the pelvis used in teaching the technic of proctoscopy

Anatomic features such as the dentate margin the valves of Houston and so on are painted on to impart a more lifelike appearance (Fig 14A) The model was designed by Mr Russell Drake of the Mayo Clinic Art Studio It serves admirably to demonstrate the fundamental principles of proctoscopy to a group of students The contour of the bowel of the model is designed according to the usual position of the lower intestine in

the pelvis and of course the dimensions of necessity are somewhat fixed As shown in the photograph of the model the bowel turns sharply anteriorly in the rectosigmoid zone Although this sharp turn frequently is encountered in the patient it is also well known that instead of such a configuration the lumen of the bowel may turn sharply to the right or left or the rectosigmoid angle may be completely absent However such variations within normal range are considered to be a fault in any type of manikin demonstration

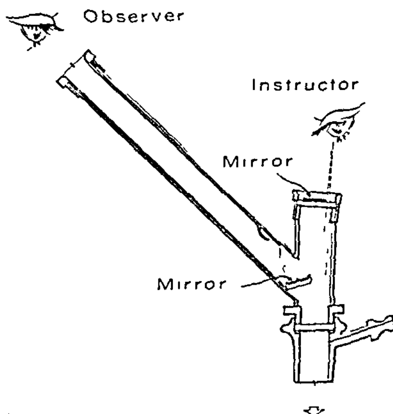


Fig 14 B The Buie observoscope Note the optical principles involved in the construction of this instrument which allows both instructor and observer to visualize simultaneously the object seen in the proctoscope

Another valuable teaching adjunct is the *Buie observoscope* This appliance which permits simultaneous observation by two persons during endoscopy of the lower bowel in living persons was designed by Buie more than twenty five years ago The

principles of it are illustrated in Figure 11B The end of the observoscope fits snugly into the distal end of the shaft of the standard Buie sigmoidoscope The distal lighting in the procto scope is adequate for both viewers Although the observoscope does permit simultaneous observation by the instructor and the student it does have a few disadvantages One is that the tiny mirror that is incorporated into the lens of the instructor s eye piece reduces his field of vision Another disadvantage is that if mucus or intestinal contents enter the proctoscope the observo scope must be removed to aspirate the material Furthermore if instrumentation through the proctoscope such as removal of a specimen of tissue for biopsy or fulguration of a polyp becomes necessary the observoscope cannot be used while the procedure is being carried out Nevertheless the observoscope is of great value in that it enables two persons to view a lesion in the bowel at the same time

Turell recently has described an attachment for his proctoscope which permits simultaneous observation of colorectal endoscopic procedures by the instructor and student The long arm of the attachment through which the observer looks contains a system of lenses which permits observation by him The cylinder to which the long observing arm is attached fits onto a Turell proctoscope It has both a proximal and a distal light and one advantage of this type of attachment is that it permits certain types of instrumenta tion to be done within the proctoscope such as removal of a specimen for biopsy fulguration and the like while simultaneous observation is still possible

Anoscopic Examination —More careful inspection of the anus can be carried out with the Hirschman type of anoscope (Fig 15) of which there are three sizes large (2 3 cm in caliber) medium (1 8 cm in caliber) and small (1 5 cm in caliber) The size of the anoscope selected for the examination depends on whether or not there is anal contraction or anal muscle spasm (as caused by a painful anal lesion) or inability of the patient to co operate The purpose of the anoscopic examination is to obtain better inspection of the anal canal such as a search for the primary source of a fistula anal ulceration and so on which may have been difficult or impossible to visualize with the standard proc

toscope Moreover the anoscope affords better visualization of lower rectal lesions Before the anoscope is removed the obturator should be replaced in the instrument When this is done the discomfort of the patient is less as the anoscope is withdrawn

Examination of the Patient Who Has a Painful Anal Lesion – If there is a break in the continuity of the anal skin such as occurs in anal fissures anal abrasions or various types of malignant or inflammatory ulcers the associated anal muscle spasm may *render any examination very unsatisfactory and cause the patient* much discomfort To relieve such a situation the author uses a topical anesthetic preparation of 1 *per cent* solution of pramoxine hydrochloride (tronothane hydrochloride) A small wisp of cotton

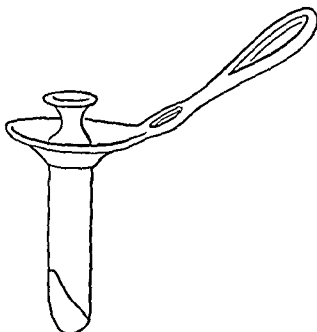


Fig. 15 The Hirschman type of anoscope

is moistened with the solution and is inserted into the anal canal with a wooden applicator Insertion of this moistened cotton is facilitated by the use of a water soluble jelly of the same preparation applied to the outside of the anal canal This preparation has very satisfactory anesthetic properties and I have yet to see a patient who is sensitive to it *which is not true of many topical*

anesthetic agents The anesthetic saturated wisp of cotton should be left in place for a few minutes before the examiner attempts to insert a finger or instrument

Examination Under Anesthesia—Proctoscopic examination with the patient under the influence of some type of anesthesia may be necessary occasionally but not often In the course of 19 291 proctoscopic examinations done at the Mayo Clinic in 1935 only thirty eight patients or approximately 0 2 of 1 per cent were hospitalized for examination under anesthesia

The reasons for the use of an anesthetic agent during examination in this period were two First although the patient had co-operated well when the examination was attempted clinically it was the impression of the examiner that he might overlook some pathologic process such as a deep lying abscess of the ischioanal fossa which might possibly be revealed after more satisfactory muscular relaxation obtained by the anesthesia Twenty five of the thirty eight patients comprised this group Second thirteen patients were fearful of the examination some justifiably so because of past experience and some because of an actual painful lesion but all of whom refused to have the procedure carried out unless it was done under anesthesia

The type of anesthesia used in all instances was caudal and sacral block with the patient in the jackknife prone position Yet even though preoperative sedation and caudal and sacral block anesthesia are employed the patient usually will experience some degree of abdominal discomfort as the proctoscope is advanced into the sigmoid because the sympathetic nerve supply to the bowel is not affected by the block anesthesia Since the examiner is guided to a great extent by the patient s reactions to this procedure it is necessary to exercise more caution and judgment in passing the proctoscope when the patient s senses are dulled by the sedation and block anesthesia

Incomplete Proctoscopic Examination—The usual proctoscope is 25 cm long and ⅝ of an inch in caliber (about the caliber of the average index finger) If the patient is co operative—and much of this desideratum is contingent on the examiner s ability to inspire confidence in the patient—the proctoscope as a rule can be passed the full distance unless some pathologic

and proctoscopic examination of them is the same as in adults Despite the advertising of certain commercial firms to promote the sales of infant type proctoscopes we examine children with an instrument of the same length and caliber as that used for adults unless some anomaly or pathologic process exists When proctoscopy is done for infants and younger children who are not old enough to co operate it is usually necessary to have a nurse hold them in position on the examining table while the procedure is carried out In some instances when the child is frightened or difficult to manage or when fulguration of a polyp is required some sedation may be necessary Actually from a technical standpoint insertion and passage of the proctoscope generally are easier in a child than in most adult persons because the lower bowel of children has not been subjected to the aging processes and as a rule has not been affected by various surgical procedures or inflammatory conditions which may make the bowel less mobile Older children accept and tolerate the examination very well by the use of the same procedure and local anesthesia as are employed for adults

Amount of Bowel Visualized at Proctoscopy —If a 25-cm proctoscope is passed its entire distance the amount of bowel visualized will vary from 25 cm to as much as 40 cm It may seem somewhat incongruous to declare that as much as 40 cm of bowel can be visualized with a 25-cm proctoscope but in redundant sigmoid colons with several loops the proctoscope actually is threaded into these loops on some occasions The length of the sigmoid will vary greatly and sometimes I have described a polyp or lesion at the upper limit under proctoscopy using a 25-cm instrument The roentgenologist will describe this same lesion in the upper part of the sigmoid For practical purposes however the proctoscopist is primarily interested in examining that part of the large intestine within the bony pelvis which is difficult to define by x ray methods

VARIETIES OF PROCTOSCOPES AND OTHER DIAGNOSTIC EQUIPMENT IN CLINICAL PROCTOSCOPY

In 1902 Tuttle produced a proctoscope in which the light carrier became a part of the instrument itself A small glass

window at the distal end of the light-carrying tube protected the bulb from being soiled by bowel contents This arrangement is still the basis of most modern proctoscopes Modifications are available commercially to accommodate the predilections of various physicians most such variants are entirely satisfactory but some have the disadvantage of being too complicated and are therefore difficult to clean and to sterilize

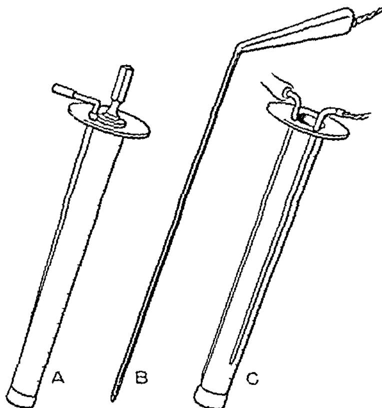


Fig 17 A The Buie diagnostic proctoscope
B The fulgurating applicator
C The fulgurating proctoscope

Buie Diagnostic Proctoscope (Fig 17A)—This is the instrument which we use and prefer because of its simplicity It is 25 cm long and is calibrated on the side in centimeters so that the approximate location of lesions can be described The reasons

Suction Apparatus (Fig 18)—Some type of suction apparatus always should be available during proctoscopic examination for the aspiration of retained enema water liquid stool or mucus which might interfere with visualization The tip of the aspirator should be rounded so that the mucosa will not be traumatized by it When fulguration is done a Y type of connection in the suction tube facilitates the procedure One arm of the Y is connected to the smoke aspirator on the fulgurating proctoscope while the other arm is connected to the liquid aspirator (Fig 19) Either arm of the Y suction can be closed as desired During fulguration procedures liquid and mucus tend to be drawn from the lesion or surrounding bowel as a result of the heat generated so that from time to time it is necessary to stop the fulguration close the clamp on the smoke aspirator and open the liquid aspirator to get rid of the accumulated fluid

Cotton Swabs—It is also necessary to have long cotton swabs available during a proctoscopic examination (Fig 20) These are used for two purposes First, they may be needed to push aside a piece of stool or to remove stool which has gotten into the lumen of the proctoscope and is obstructing direct vision Second they are used on occasion to ascertain how readily the mucosa of the bowel is traumatized or is made to bleed Normal intestinal mucosa can be rubbed rather vigorously with a cotton swab without causing any bleeding whereas the very first indication that certain inflammatory processes exist is mucosal bleeding after only slight trauma



Fig 20 Type of cotton swab used as an adjunct in proctoscopy

Biopsy Forceps—Another instrument that should be available during any proctoscopic examination is the biopsy forceps Two types of modifications thereof are necessary The Buie biopsy forceps (Fig 21 A) is used for removal of specimens of tissue from various lesions of the bowel Bleeding of any consequence is a very rare complication after removal of specimens for biopsy

which means that the practice of fulgurating the site from which a specimen of tissue is removed from an adenocarcinoma or a polyp is largely superfluous On only one occasion have I witnessed serious bleeding after removal of a specimen of tissue from a lesion of the bowel This bleeding occurred in a patient with portal cirrhosis who had large rectal varices which extended as far up as the area of the rectosigmoid The mucosa overlying one varix and the anterior wall was reddened and ulcerated very likely as a result of erosion Grossly the possibility of neoplasm had to be ruled out and when a specimen of tissue was removed from the ulcerated area blood welled out and filled the rectum within a short time Hospitalization the administration of blood and several days of rectal packing were necessary Radium packs subsequently were used over the area to produce scar tissue and to help obviate hemorrhage in the future

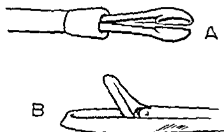


Fig 21 A Buie biopsy forceps B Miles nasal biopsy forceps

Specimens for Biopsy Taken From Anus—To take specimens for biopsy from the anus either local infiltration or nerve block anesthesia may be necessary A cutting type of instrument such as the Miles nasal biopsy forceps is used (Fig 21B) Significant bleeding after the taking of a specimen for biopsy is more likely to occur when tissue is taken from anal lesions but this bleeding usually can be controlled with a piece of oxidized gauze

COLOSCOPY AND ILEOSCOPY

Endoscopic examination of abdominal stomas frequently is necessary either at the time of operation with a sterile procto scope or periodically after establishment of the stoma depending

on the patient's symptoms In most instances an instrument of smaller caliber meaning one which is 5/8 of an inch in diameter is required for passage through the abdominal stoma The patient is prepared by irrigating with plain warm water the loop of bowel to be examined The examination is carried out with the patient in the supine position When a temporary or double loop colostomy has been performed and it is desired to ascertain if the distal loop of bowel has an adequate lumen before closure is completed it may be necessary to examine the patient from above and below (Fig 22 and 23) After proctoscopy has been done by way of the rectum a No 18 F catheter is passed through the proctoscope and is left in place The proctoscope is withdrawn The patient is then placed in the supine position and the distal loop of bowel is examined with the instrument Then if the catheter can be visualized as in Figure 23 it must follow that all of the distal

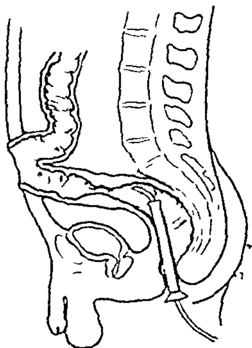


Fig 22 Technic of examination and determination of the patency of the distal segment of bowel by way of the rectum (Reproduced with permission of the publishers from Jackman R J and Buie L A Diverticula of the Colon J A M A 121 1144-1146 [Apr 3] 19[illegible])

loop of bowel has been visualized Hence the situation is satis factory for closure if there are no contraindications

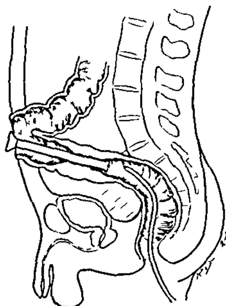


Fig 23 The catheter inserted from below is visualized through the distal portion of the bowel to see if the lumen is adequate before closure is done (Reproduced with permission of the publishers from Jackman R J and Buie L A Diverticula of the Colon *J.A.M.A* 1.1 1144 1146 [Apr 3] 1946)

BIDIGITAL EXAMINATION

Sometimes tumors or areas of induration such as occur from a chronic walled off abscess in either ischioanal fossa are missed even though a thorough digital examination of the rectum is car ried out When an acute or subacute inflammatory process is present the diagnosis is obvious in view of the presence of redness swelling and tenderness but when a chronic abscess is present it generally can be palpated only by rolling the tissues of the fossa and the perianal area between the thumb and index finger as in Figure 24

OTHER SPECIAL DIAGNOSTIC PROCEDURES APPLICABLE TO LARGE INTESTINE

The patient's history and the physical findings that are made determine *just what diagnostic procedures are indicated in a study of the colon* The three special tests which can be applied to the large intestine are (1) examination of stools (2) proctoscopic examination and (3) roentgen ray studies of the colon If all three of these tests are contemplated they should be carried out in the sequence listed above In a large measure each of the tests mentioned dictates whether or not the next one is indicated For instance the finding of Entamoeba histolytica in the stools might possibly obviate the necessity of a proctoscopic examination and a roentgenogram of the colon Likewise the finding of a carcinoma of the sigmoid at proctoscopic examination might well contraindicate the making of a roentgenogram of the colon a procedure which could be dangerous to the patient If barium passes above an annular obstructing type of lesion it may produce complete obstruction Barium has a sedative effect on certain intestinal parasites such as Entamoeba histolytica so that examination of the stools carried out within two weeks after use of a barium enema will be unsatisfactory

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Chapter IV

TRANSRECTAL BIOPSY IN INTRAMURAL AND EXTRARECTAL TUMORS AND ROENTGENOLOGIC DIAGNOSIS OF LESIONS OF THE LOWER BOWEL

REVIEW OF THE LITERATURE

In a review of the literature nothing pertinent to transrectal needle biopsy could be found except as this technic pertains to the prostate gland For many years internists have used various types of biopsy needles for obtaining tissue from the liver for microscopic study During recent years surgeons have found that specimens of tissue obtained for biopsy with a Silverman needle are of particular value in suspected thyroiditis and at the time of laparotomy the technic is of special value in obtaining tissue from the pancreas because specimens for biopsy can be taken from several areas to determine the presence or absence of malig nant involvement [9]

PERINEAL PROSTATIC BIOPSY

Needell and co workers reported on 50 cases in which specimens *of prostatic tissue for biopsy had been taken by way of the per* ineum with a Silverman needle and they concluded that the pro cedure is relatively simple accurate and safe when it is used selectively in the diagnosis confirmation of diagnosis and study of prostatic malignant lesions The bladder was punctured during the procedure in seven cases and transient hematuria was noted in four cases These incidents were not treated but were simply observed for possible untoward results but none were seen

TRANSRECTAL BIOPSY OF THE PROSTATE GLAND

Grabstald in 1954 reported on one hundred cases in which tissue from the prostate gland had been obtained transrectally

for biopsy. He prepared his patients by administering a cleansing enema only. The procedure was done with the patients under the influence of either spinal anesthesia or caudal sacral block anesthesia. His technic is as follows: After the anus has been dilated a Fansler operating rectal speculum is introduced. Grabstald prefers the Fansler rectal speculum because it has a wide caliber slot which permits easy palpation of the prostate gland to find the suspicious nodule — a search which can be made only by palpation. Most anoscopes are not sufficiently large to permit a palpating finger to pass through. Grabstald makes a stab incision through the rectal wall over the suspicious area and the prostate gland is palpated with a finger through the wound. To obtain the specimen for biopsy he uses an Oldberg pituitary rongeur forceps.

Of seventeen patients who had an isolated suspicious nodule in a freely movable prostate gland, sixteen were proved to have carcinoma of that structure. In the remaining patient, prostatic tissue obtained transrectally two different times showed only chronic prostatitis with fibrosis, a condition which clinically accounted adequately for the hard nodule.

Complications were minimal in the one hundred cases, and despite the transrectal approach, severe infections were not observed in a single instance. Grabstald concluded that the transrectal approach is the procedure of choice in the taking of tissue for biopsy from an inoperable carcinoma of the prostate gland as well as from the prostatic nodule which is suspected to be malignant.

TECHNIC OF PROCEDURE

For several years now, to a limited extent, the author has used the Silverman needle to obtain specimens of tissue for biopsy not only from prostatic lesions but from other intramural and extrinsic masses in the bowel. The lower bowel is cleansed with enemas. The procedure is best carried out in the hospital with the patient under the influence of caudal and sacral block anesthesia. After the anus has been dilated a Fansler operating anoscope (Fig. 26) is used, for the reasons set forth in the previous section. The mucosa at the site of insertion of the needle is painted

with a suitable antiseptic agent The Silverman needle is inserted through the mucosa and submucosa up to the tumor mass Usually more resistance is encountered to the advancement of the needle when the tumor is reached The solid stylet is then removed Insertion of the cutting blades into the tissue ahead of the sheath for 1 to 2 5 cm is then carried out The sheath is then advanced over the cutting blades an action which traps a core of tissue[6] Rotation of the needle is unnecessary in fact if it were done it might destroy the alignment of the cutting blades of the needle If possible it is best to obtain a core of tissue from more than one area of the mass—preferably two or three We have found the stab wound and use of a Rongeur as suggested by Crabstald to be unnecessary

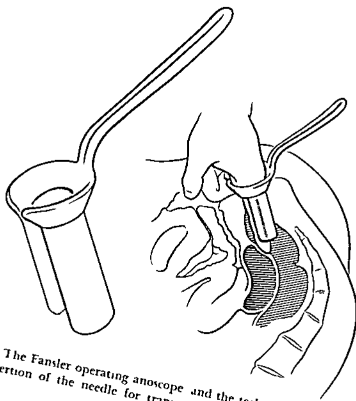


Fig 26 The Fansler operating anoscope and the technic of palpating the site for insertion of the needle for transrectal needle biopsy

Precautions—When prostatic cul-de-sac or rectovesical masses are present it is safest to insert needles laterally rather than in

the midline anterior where puncture of the bladder or posterior urethra is more likely to occur during this maneuver If the tumor is large more than one core of tissue should be removed for biopsy

Indications—The procedure is indicated and often will afford a definitive diagnosis when solid presacral and cul-de-sac tumor masses are present It is also indicated when it is desired to take specimens of tissue from suspicious areas in the prostate gland

Complications—Those who have had considerable experience with this procedure particularly in the presence of prostatic lesions report that puncture of the bladder or urethra is the most common complication but in all such cases recovery was complete nothing more than observation being necessary In the author's experience with this procedure the only complication that occurred was extravasation of blood into the perineum and perirectal tissues of one patient who had undergone transrectal needle biopsy of the prostate gland Perhaps one reason for the limited favor accorded transrectal needle biopsy is the fear which I believe is groundless of infection or formation of an abscess at the site from which tissue is taken I have never seen such a complication nor has it been reported in the literature In all probability however additional experience with this procedure will produce more complications

If chordomas or suspected neoplastic lesions are present the possibility that this technic might contribute to seeding of the tumor has to be considered but it would seem to me that the advantage of a definitive preoperative diagnosis would far outweigh the rather remote possibility of unintentional dissemination of a tumor mass

OFFICE TECHNIC

Transrectal biopsy of the prostate gland can be carried out in the office but as I have indicated hospitalization and the use of regional block anesthesia are much to be preferred If infiltration anesthesia is not used patients occasionally complain of a dull ache or sickening sensation when the needle is inserted This is particularly true when the prostatic approach is used and is less true when solid presacral tumors are present When the

transrectal excision of tissue for biopsy is used as an office procedure. It is sometimes difficult to ascertain exactly where the suspicious spot is located in the mass. The Fansler anoscope is too large to insert into the anus without anesthesia. Therefore the needle is inserted along with the index finger through the anus, the bevel of the needle being turned toward the finger so that trauma to the anus will be avoided. When the site at which the needle is to be introduced has been determined, it is marked with the point of the needle. The finger and needle are then withdrawn, a Hirschman anoscope is introduced, the previously marked site of the needle point is visualized, and the procedure is carried out through the anoscope as described in the section on use of this technic in the hospital.

It should be pointed out that a negative result of biopsy of a suspected intramural or extrinsic malignant process cannot be considered to be final. In my opinion the transrectal taking of specimens of tissue for biopsy by means of a Silverman needle is a sound procedure that should be used more frequently than it is to determine the nature of certain intramural and extrinsic tumors in this area.

ROENTGENOLOGIC DIAGNOSIS OF LESIONS OF THE LOWER BOWEL

Most roentgenologists believe that their part in the diagnosis of lesions of the lower part of the large intestine is subordinate to that of endoscopy because the bony pelvis interferes with proper roentgenologic visualization. Weber wrote that "the roentgenologic maneuver has not been satisfactory for the diagnosis of rectal and sigmoidal lesions within reach of the proctosigmoidoscope, nor do I believe that it can be made to be satisfactory and it is a mistake for the roentgenologist to assume the responsibility of diagnosis for that portion of the intestinal canal." Other authors such as Shanks and Kerley have written that "It is possibly an overstatement to say that radiology should play no part in examination of the rectum."

On the other hand, Andren and Frieberg, after an experience in 3 500 double-contrast roentgenologic examinations performed in accordance with their special technic, concluded that the

roentgenologic procedure they use is the most reliable and most nearly accurate method particularly in the diagnosis of small tumors. Although they had made no systematic comparison between the relative merits of proctoscopy and roentgenologic diagnosis, they wrote that they repeatedly found polyps that had been overlooked at proctoscopy. In only two of their cases were polyps found with the proctoscope that had been missed by roentgenologic diagnosis. These authors said that in order to detect very small polyps, maximal definition is required in the roentgenogram and that such enhancement of definition can be attained only by distance photography and fine focus. They also declared that the bowel must be kept free of mucus since the mucous layer can entirely conceal a polyp and, in addition, render the contrast adhesion of the barium more difficult. Clysodrast and atropine are administered to the patient to reduce the mucus. To obtain a satisfactory coating of the contrast medium on the intestinal wall, a contrast medium of thick consistency is used. Then roentgenograms must be made in several projections, since phleboliths or axial projected arteriosclerotic blood vessels may simulate polyps.

I do not propose to mediate in the contention as to whether or not roentgenologic examination of the lower bowel can be employed satisfactorily for the detection of small intraluminal projections such as polyps. If it were assumed that this type of examination could be carried out successfully for the stated purpose, from a practical standpoint it would be expensive, time consuming and arduous for the patient as compared with proctoscopy. Furthermore, even if a polyp or polyps should be detected by roentgenologic methods, proctoscopy and fulguration would be necessary subsequently to eradicate them. It has been my practice to destroy these small polyps by fulguration at the time proctoscopy is done initially.

The value of the roentgenologic diagnosis of presacral masses, especially if there is erosion of bone, as well as roentgenologic examination of the large intestine proximal to the proctoscopic range, is unquestionable.

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Chapter V

APPEARANCE OF THE MUCOSA IN NORMAL AND FUNCTIONAL COLONIC CONDITIONS A CLASSIFICATION OF INTRINSIC LESIONS OF THE LOWER BOWEL

NORMAL MUCOSAL VARIATIONS

The *normal mucosa will vary considerably in appearance* among different persons. In some the vascular pattern is very marked (Plates 2 and 3); in others no gross vascular pattern is evident (Plate 4). The degree of injection of the blood vessels is altered considerably by different types of enemas. In certain persons a soapsuds, glycerin or peroxide enema will cause marked injection of the mucosal blood vessels. Because of this the inexperienced proctoscopist might be inclined to diagnose an inflammatory process when such does not exist. Peroxide enemas are likely to cause a violent reaction in the mucosa, especially if the enema remains in the bowel for longer than a few minutes. This will be discussed further in Chapter 6.

Enlarged Lymph Follicles.—Another type of normal mucosa which is frequently confusing to the novice is one with *enlarged lymph follicles.* Lymph follicles are present in all mucosal tissues of the bowel, but the size of the follicle will vary considerably and still remain within normal limits. In the author's experience these enlarged lymph follicles are seen most frequently among infants and children or among persons who tend to have generalized lymphoid hyperplasia. The mucosa has a coarse, "pebbly" appearance (Plate 5); in some patients the follicles are so conspicuous that the appearance is mistaken for that of a polypoid mucosa. I have also seen the condition mistakenly diagnosed as inactive chronic ulcerative colitis because in some persons the follicles produce a granular appearance.

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Nesselrod described the normal rectal mucosa as having a velvety appearance because of the minute openings of the crypts of Lieberkuhn The edges of the crescentic valves of Houston are sharply defined (Plate I) The rectal mucosa tends to be smooth while that of the sigmoid is in folds and is described as being rugose Moreover the caliber of the lumen of the lower bowel will vary considerably among different persons In general the rectal lumen is several times larger than that of the sigmoid and although the rectosigmoidal juncture is not a consistent landmark it usually can be identified by a fairly abrupt change in the caliber of the lumen and by the appearance of the rugal folds in the sigmoid Another internal landmark of the rectosigmoidal juncture is that the bowel turns anteriorly or to the right or left at this point

Amount of Mucus—The amount of mucus in the bowel is not of pathologic significance Some of the early writers indicated that a large quantity of mucus secreted into the bowel is specific for a diagnosis of mucous colitis Actually a large quantity of mucus in the bowel does not reflect an inflammatory process and does not signify colitis at all The presence of mucus in the bowel is as normal as the presence of saliva in the mouth and the amount of it is influenced greatly by many factors such as emotional upsets or the type of enema that the patient has used in prepara tion for proctoscopy Commercially prepared enemas which con tain sodium biphosphate tend to produce considerable mucus but this is not a handicap to the proctoscopist because the mucus can be aspirated easily On the other hand most radiologists prefer that the patient not use this type of enema in preparation for the making of roentgenograms of the colon because the amount of mucus which the enema produces will interfere with filling of the colon by the barium mixture In some persons whose bowel secretes much mucus the mucus will dry out and form a cast of the bowel Finally the cast is expelled and then a very agitated patient confronts his physician with the report that he passed a piece of intestine

Proctitis Sicca—From an objective standpoint perhaps the exact antithesis of what is called mucous colitis is what some proctoscopists speak of as proctitis sicca a condition which is

not proctitis but a dry, sticky bowel or a mucosa that secretes very little mucus. Proctitis sicca is not pathologic. Probably it is seen most frequently in patients who have taken cathartic agents for many years. Since the lubricating effect of a normal quantity of mucus is lacking among such persons, it may be necessary in proctoscopy to open the lumen of the bowel ahead by use of the bellows to blow in a little air.

Unused Segment of Colon.—A temporary or loop type of colostomy sometimes is performed by surgeons to put that part of the bowel distal to the colonic stoma at rest. An example of an inflammatory process for which such a procedure might be performed is acute diverticulitis. This segment of bowel at rest is spoken of as an "unused segment." The mucosa of an unused segment of bowel will, as a rule, bleed more readily than is normal when it is rubbed with a cotton swab. The appearance of the mucosa in such a segment is perfectly normal except that the mucosa traumatizes more easily than does that of the bowel that is in constant use, as manifested by bleeding. This type of bleeding from the mucosa of an unused segment of bowel usually does not occur unless the colonic anastomosis or shunt above it has been established for at least a year.

INTRINSIC LESIONS CLASSIFIED

Intrinsic lesions of the lower bowel include those conditions which for the most part originate in the lining of the lower bowel, as opposed to extrinsic lesions which originate outside the wall of the lower bowel. By their very nature, certain intrinsic lesions may become intramural or extrinsic, just as certain extraluminal lesions, such as an endometriotic process or certain malignant extensions, may become intrinsic.

A satisfactory working classification for intrinsic lesions is as follows:

I. Ulcerations
    1. *Traumatic ulcers*
        a. Enema tip abrasions
        b. Instrument abrasions
    2. *Chemical ulcers*
        a. Peroxide enemas

- b. Mucosal burns
3. Erosion ulcerations
4. Irradiation ulcers
5. Inflammatory ulcers or processes
   - a. Chronic ulcerative colitis
   - b. Amebic ulcerative colitis
   - c. Ulcers of regional ileitis (a, b, and c are discussed in chapters dealing with those subjects)
   - d. Tuberculous ulcers
   - e. Ulcers caused by Schistosoma mansoni
   - f. Bacillary dysentery
   - g. Ulcers caused by Balantidium coli
   - h. Histoplasmosis
6. Malignant ulcerations

II. Neoplastic and preneoplastic diseases arising from the mucosa

1. Adenomatous polyps
2. Multiple polyposis (familial)
3. Peutz-Jeghers syndrome
4. Inflammatory polyps
5. Adenocarcinoma
6. Carcinoids (Although carcinoids arise from the mucosa of the bowel near the basement membranes of the Kulchitsky cells in the crypts of Lieberkühn, we have chosen to include them with intramural lesions because they most frequently appear as submucosal nodules. It is unusual for a carcinoid of the rectum to have ulcerated through the mucosa.)

III. Granulomatous lesions

1. Foreign body granulomas from
   - a. Nonabsorbable sutures
   - b. Barium
2. Lipoid granulomas
3. Amebic granulomas
4. Lymphogranuloma venereum
5. Syphilis

Since the definition of what constitutes a granuloma is so expansive— a tumor or neoplasm made up of granulation tissue —the foregoing list of lesions could be enlarged almost indefinitely

I have listed only those which I have seen It might well be argued that other lesions manifestations of which are rather common to the perianal area and which form granulomas such as the lesions of regional ileitis and hidradenitis suppurativa could be listed here

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Chapter VI

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS OF ULCERATIONS OF MUCOSA OF THE LOWER BOWEL

Broadly speaking ulcers of the mucosa of the terminal part of the bowel are included in two main groups (1) *diffuse* and (2) *discrete* The inexperienced proctoscopist should attempt to classify all ulcerations into one of these two main groups When he does so he will save himself much difficulty and disappointment because relegation of the ulceration to either group eliminates many possibilities for error and confusion

Admittedly even to the experienced some of the rectal ulcerations are difficult to categorize because of secondary ulcerations erosions mixed infections and the like Recourse to the history and to clinical and laboratory assistance frequently is necessary

If the ulceration is typical it is diagnostic but at other times it is only suggestive For instance I should hesitate to make an unequivocal diagnosis of a tuberculous ulcer of the lower bowel without supportive evidence that the patient has a tuberculous focus

CLASSIFICATION

The following is a satisfactory working classification for the various ulcers seen at proctoscopic examination

- Traumatic ulcers
  - Enema tip abrasions (discrete)
  - Instrument abrasions (discrete)
- Chemical ulcers
  - Hot retention enema proctitis (diffuse)
  - Hydrogen peroxide proctitis (diffuse)
- Irradiation ulcers (discrete)
- Erosion ulcerations (discrete)

Inflammatory ulcers
- Chronic ulcerative colitis (diffuse)
- Amebic ulcerative colitis (discrete)
- Ulcers of regional ileitis (discrete—may be diffuse)
- *Venereal lymphogranuloma* (discrete or diffuse)
- Tuberculous ulcerations (discrete)
- *Schistosomiatic* (mansoni) ulcerations (discrete)
- Bacillary dysentery (either but usually discrete)
- *Balantidium coli* ulcerations (discrete)
- Histoplasmosis (discrete)

Malignant ulcerations (discrete)

TRAUMATIC ULCERS

Traumatic ulcers usually are the results of trauma inflicted by enema tips or instrumentation. Enema-tip ulcers or wounds generally occur on the anterior rectal wall in the lower few centimeters of rectum, and they result from misdirection of the enema tip while the tip is being inserted. A resulting injury usually appears as a linear wound a few millimeters wide to a centimeter or two long, from which the mucosa has been denuded (Plate 6).

Inexperienced proctoscopists will on occasions remove a divot of mucosa in passing the proctoscope. The importance of the traumatic ulcer is that it be recognized as such and that it not be confused with something more significant.

CHEMICAL ULCERS

On occasion I have seen various degrees of *proctitis resulting from retention enemas that were too hot.* *In the presence of certain* inflammatory processes and vague rectal pains, hot retention enemas have great therapeutic value, but the temperature of the water should never exceed 105° F., at least without careful nursing supervision. When a patient is instructed as to the manner of preparing a hot retention enema, it is a good plan to advise him or her to use water as warm as the hand will tolerate for 1 minute. *In general, if the hand will tolerate the heat of the water there will* be no difficulty in the use of the water for an enema. It is unwise for the patient to attempt to use a *thermometer*, for he may do so improperly, and the reading will not be accurate. The rectal burns that I have seen were sustained after patients had tested

the temperature of the enema with a thermometer rather than with the hand

Perhaps a much more common type of chemical proctitis is that resulting from various mixtures of *hydrogen peroxide* used as an enema Different persons seem to exhibit variations in their reactions to the peroxide enema but in general the damage is in proportion to the degree of concentration of the peroxide and the length of time the solution remains in contact with the mucosa Pumphrey wrote that it is unwise to use hydrogen peroxide enemas in solutions stronger than 3 per cent meaning about 1 fluid ounce of peroxide to 500 cc of water If the patient has difficulty in expelling the enema and if the enema has been retained for more than fifteen or twenty minutes it should be drawn off or diluted further by the instilling of more water into the rectum A history that a peroxide enema has been used as a rule is sufficient basis for the diagnosis of hydrogen peroxide proctitis When shortly after introduction of the enema the symptoms of tenesmus and a bearing-down sensation appear with the passage of bloody mucus they are suggestive that the rectal mucosa has been affected

The proctoscopic picture will vary considerably depending on the concentration of the peroxide in the enema and the length of time it has been in contact with the mucosa As would be expected the greatest activity is in the lower part of the rectum The mucosa may be completely denuded in patchy areas and the intervening mucosa bleeds more readily than does normal mucosa (Plate 7) Some authors have described reactions from a peroxide enema so severe that all the mucosa in the lower bowel was completely sloughed I have never seen this extreme The important feature in the differential diagnosis is a history of the use of a peroxide enema followed by the passage of bloody mucus and the presence of tenesmus If patients thus afflicted are seen early the rectum should be washed out with a plain water enema then 2 fluid ounces of warm mineral oil should be instilled into the rectum and rest in bed instituted for a few days

IRRADIATION ULCERATION

Synonyms for this condition are factitial proctitis or factitial ulceration I prefer the term irradiation ulceration to describe

this condition because the ulceration or proctitis is caused by the rays of radium or by x-rays. Although the ulceration or proctitis is factitial, meaning artificially or unintentionally produced, the *same is true of several other rectal lesions,* specifically hydrogen peroxide proctitis. In my opinion the term "irradiation ulceration" or "irradiation proctitis" is more descriptive.

Most writers on the subject call irradiation ulceration a "justifiable lesion" in the sense that it does not indicate faulty technic on the part of the radiation therapist. This may be true to a certain extent, but most radiologists and the author certainly agree that the extent and severity of the irradiation proctitis or ulceration are in direct proportion to the length of time that the rectum is exposed to irradiation and to the amount of shielding that is used around the source of irradiation.

Proof of the foregoing statement is best illustrated by the fact that in 1955, in the course of 19,581 proctoscopic examinations, irradiation proctitis was diagnosed in only thirty-five female patients (0.02 per cent), in most of whom the reaction was of fairly mild degree. Nearly all of the thirty-five patients had been treated with radium for carcinoma of the cervix. The figures just quoted may be contrasted with those of twenty years ago, or the year 1935, when, during the course of approximately 10,000 proctoscopic examinations, 106 instances of irradiation proctitis were found. In many cases the condition was very severe, with extensive sloughing processes in the rectum. In other words, *improved technic in the application and shielding of the irradiation* eliminates or minimizes the degree of irradiation proctitis. The mere fact that the incidence is decreasing indicates that the *reaction itself is preventable and therefore, in my opinion, not justifiable.*

At any rate, the lesion occurs after irradiation for conditions, usually malignant, involving pelvic structures (*generally the cervix uteri*) other than the rectum.

Proctoscopic Picture.—The proctoscopic picture, as might be suspected, varies greatly from mild hyperemia of the mucosa to an extensive greenish-gray, tenacious sloughing process which may cover the entire anterior rectal wall. The most intense reaction as a rule is in that part of the anterior rectal wall that is

adjacent or closest to the uterine cervix (Plate 9 and Fig 27) The sloughing may persist for months but gradually it gives way to scar formation The scar has numerous telangiectatic blood vessels (Plate 8) which bleed readily on slight trauma If the area is brushed with a cotton applicator the cotton comes away blood tinged Fortunately irradiation proctitis is self limited but considerable time may pass before it heals sometimes several years may be required During this healing process the patient may acquire severe secondary anemia as a result of the daily long-continued loss of blood so that it may be necessary to counteract this by the use of iron therapy or by the occasional administration of blood

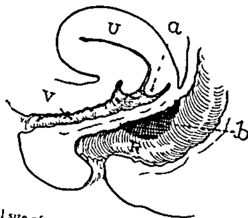


Fig 27 The usual site of occurrence of radiation ulceration in the rectum

Classification — Based on the proctoscopic appearance Sherman classified irradiation changes of the rectum into four categories depending on the severity of the process This would seem to be a reasonable classification It is as follows

Grade I —(a) Localized erythema and telangiectasis friable mucosa that bleeds easily no ulceration or stricture (Plate 8) (b) More diffuse erythema with accompanying periproctitis marked pain and sensitivity

Grade II —This is characterized by ulceration with grayish tenacious sloughing usually involving the anterior rectal wall proctitis as seen in grade I irradiation ulceration will be present at the periphery of the ulceration (Plate 10)

Grade III.—This is characterized by the presence of a stricture plus proctitis and ulceration (Plate 11).

Grade IV.—This is characterized by *proctitis, ulceration, stric*ture and a rectovaginal or rectovesical fistula or a perforation of the bowel (Plate 35).

Symptoms.—On the basis of the description of the four grades just listed, it should not be difficult to predict the symptoms. Buie wrote that the average interval between the last application of roentgen rays and the appearance of rectal symptoms is five months, that the shortest interval is one week, the longest six years, and that two thirds of the patients are free from symptoms for three months after treatment.

The patient's presenting complaint is that she has passed blood with the stool. More commonly than not, the blood is clotted because it has the form of gradual oozing from the site of involvement, and there is sufficient time for the blood to clot before it passes from the rectum.

Coincident with the appearance of rectal bleeding there is a variable degree of tenesmus or rectal irritability, manifested *by a constant urge to defecate. At each attempt at defecation a* little bloody mucus is passed. If a rectovaginal fistula forms, feces or gas or both may be passed from the vagina. Most patients complain of a dull aching pain up in the rectum which is difficult for them to describe or to locate accurately.

The one consistent proctoscopic finding is that there is always telangiectasis either in the scar or adjacent to the ulcerated site. These tiny new blood vessels are situated superficially in the scar and they bleed at the slightest trauma.

Diagnosis.—The diagnosis as a rule is not difficult if the possibility of irradiation ulceration is kept in mind. Since symptoms do not arise, as a rule, for several months after irradiation, the patient will not associate the occurrence of the rectal symptoms with the irradiation. *Thus it may be necessary to ask a direct* question as to whether or not irradiation has been used.

Buie has written that in 91 per cent of cases the irradiation ulceration is limited to the anterior rectal wall and that in an additional 5 per cent it involves the anterior wall with other portions of the rectum (Fig. 27).

If the process presents itself as an ulcer the lesion generally is a single ulcer at about 6 to 10 cm above the dentate margin on the anterior rectal wall opposite the cervix The size of the ulcer usually is about 1 to 3 cm It is depressed and covered by a gray or yellowish membrane but of course the size and appearance vary greatly depending on the stage of healing The ulcer is surrounded by a zone of telangiectasis and when healing of the ulcer is complete the telangiectasis persists in the scar I have observed that the process sometimes is confused with malignant lesions and that a considerable number of patients are referred to the Mayo Clinic for cancer of the rectum when the process actually is irradiation proctitis

Even if tissue is removed from the edge of the irradiation ulcer for study by the pathologist it may be confusing to him if he is not advised that the patient concerned had received radium treatment because the irradiation will change the cellular structure to such a degree that the nuclei frequently are pyknotic and irregular not unlike the microscopic picture of a low grade malignant process

Treatment —Since in general irradiation ulceration is self limited the treatment is principally symptomatic The use of a small warm cleansing enema after each bowel movement will help lessen the tenesmus and perhaps promote healing Buie has advocated the instillation and retention of 2 to 3 fluid ounces of warm witch hazel because of the astringent action of this agent When rectal irritability is a great factor a warm retention enema of 2 to 3 fluid ounces of olive oil is of some help I feel that the use of a few fluid ounces of a solution of corn starch in warm water (heaping teaspoonful of the corn starch to the pint) will help to lessen rectal irritability

Acquainting the patient with the fact that the process is self limited and that perhaps as much as a year will be required for it to heal will help to allay apprehension Values for hemoglobin and the erythrocyte count should be determined periodically and appropriate steps should be taken to counteract the tendency toward secondary anemia

Such complications as rectovaginal fistula rectovesical fistula and rectal stricture usually are surgical matters and the surgical measures in each case must be individualized

EROSION ULCERATIONS

Erosion ulceration of the mucosa of the lower bowel can occur through the lumen of a stricture (Plate 12) or the mucosa overlying an intramural or extrinsic tumor mass. When this occurs it may be difficult to rule out a primary malignant process unless specimens of tissue are removed for biopsy.

INFLAMMATORY ULCERS

Ulcerations of the mucosa which occur in the presence of chronic ulcerative colitis, regional ileitis, amebic colitis and venereal *lymphogranuloma* are discussed elsewhere in this book under the headings which deal with those conditions. To be *discussed in this chapter are the less frequently seen inflammatory* ulcers of (a) tuberculosis, (b) schistosomiasis (mansoni), (c) bacillary dysentery, (d) balantidiasis and (e) histoplasmosis.

Tuberculous Ulcerations — Tuberculous ulcerations of the lower bowel now are seen less frequently. Whether or not the reduced incidence is the result of the several new anti-tuberculous drugs that have appeared in the last few years I do not know. However, the fact remains that during the course of several thousand proctoscopic examinations I have not seen an ulcer of the lower bowel suspected of being tuberculous in the past two years.

Proctoscopic Appearance.—As is true of most ulcerations of the lower bowel, there is nothing truly specific about the gross appearance of a tuberculous ulcer. Generally the diagnosis is reached in this manner: *if a patient has a discrete ulcer or ulcers of the rectal mucosa of various sizes and shapes and if it is known that this patient has pulmonary tuberculosis or tuberculosis in some other focus, in all probability the ulcers in the rectal mucosa are tuberculous.* The two lesions with which tuberculous ulcerations are most likely to be confused are the ulcers of amebic colitis and the secondary ulcers of regional ileitis. Tuberculous ulcers have elevated borders and they tend to be larger than the two types mentioned previously. They start out as tiny tubercles (Plate 13) which ulcerate and may become confluent and therefore they can assume almost any size or shape. *The finding of tuberculous ulcers* at proctoscopy indicates that the patient has far

advanced tuberculosis and that he should be in a sanatorium

Hyperplastic Rectal Tuberculosis—In my opinion many cases of so-called hyperplastic rectal tuberculosis reported in the older literature actually were cases of rectal involvement by venereal lymphogranuloma or old long standing chronic ulcerative colitis From an objective standpoint at least there is nothing that would set hyperplastic rectal tuberculosis apart in clear-cut distinction Yet if the patient has pulmonary tuberculosis and the lumen of the bowel is reduced with a scarred thickened inelastic intestinal wall hyperplastic tuberculosis of the rectal mucosa might be suspected

Schistosomiatic (mansoni) Ulcerations—Ulcerations of schistosomiasis (mansoni) have not been seen by this writer but undoubtedly they do occur in areas in which schistosomiasis is prevalent Warner wrote that in view of the migration and concentration in the eastern part of the United States of 700 000 Puerto Ricans among whom the disease is rather prevalent schistosomiasis will become a major medical and surgical problem Manifestations of the disease in the lower bowel are brought about by the fact that after the larvae of Schistosoma mansoni have been ingested they enter the portal circulation where maturity reproduction and the laying of eggs occur The escape of the eggs from the venules and capillaries of the submucosa through the mucosa and into the rectum produces the pathologic changes seen at proctoscopy

Proctoscopic Picture—Warner who has had considerable experience in examining the lower bowel of patients afflicted with schistosomiasis wrote that the most conspicuous and constant proctoscopic findings are small erosions which may be bleeding or may appear as tiny discrete circumscribed red spots on an otherwise normal appearing mucosa

In addition to the erosions and petechial hemorrhages Warner said miliary raised granulomas of varying size and in varying stages of polypoid formation occur It is by means of these polypoid granulomas or mucosal erosions that the eggs are extruded into the rectum

Diagnosis—To confirm the *diagnosis of schistosomiasis* a section of mucous membrane containing one of the granulomas or

erosions is removed and placed on a glass slide A drop of saline solution is placed on the section and a cover slip is applied The section is then examined microscopically for the presence of eggs Since the ease of travelling is ever increasing the possibility of infection with Schistosoma mansoni should be kept in mind when proctologic patients from certain geographic locations are encountered

Bacillary Dysentery—Bacillary dysentery is an acute inflammatory process of the colon characterized by a sudden onset with fever frequent bloody rectal discharges abdominal cramps and severe prostration Manson Bahr wrote that it is safe to regard acutely developing tropical diarrhea as either bacillary dysentery or amebic dysentery Bacillary dysentery is characterized by a more rapid onset higher fever more frequent stools rapid pulse and generally a more acutely ill patient than in amebic dysentery

Proctoscopic Picture—At proctoscopy the mucosa of the lower bowel will be seen to exhibit diffuse hyperemia hemorrhagic spots and edema If the patient is seen early in the disease there usually is no ulceration and the process is indistinguishable from early acute chronic ulcerative colitis When ulceration does appear as it usually does after the first day of symptoms it is quite characteristic and not easily confused with any other type of ulceration that occurs in the mucosa of the lower bowel The ulcers are relatively large and superficial giving the appearance that the superficial layers of mucosa have been shaved with a very sharp razor The borders of the ulcers are irregular and flat meaning that they are neither elevated nor depressed The ulcers tend to have a patchy arrangement and are covered with a thin gray membrane that is easily wiped away after which the ulcerated area bleeds easily Some authors say that this gray membrane may cover the entire lower bowel but I have never observed it to do so

The proctoscopic appearance of acute bacillary dysentery most likely would be confused with the appearance of early fulminating chronic ulcerative colitis that is before the miliary abscesses of chronic ulcerative colitis are manifest Subsequent developments or another proctoscopic examination a few days later will distinguish between the two diseases Bacillary dysentery

tends to be a self limited acute disease responding well to some of the antibiotic drugs particularly erythromycin Severe chemical proctitis such as might result from a peroxide enema is very similar objectively to acute bacillary dysentery but of course the history would distinguish between the two conditions

Diagnosis — The proctoscopic *diagnosis of acute bacillary dysentery* is presumptive only Absolute diagnosis rests upon microscopic examination of the feces a procedure which is supposed to be valuable if it is carried out early in the course of the disease Serum agglutination tests are of help later on

Some writers describe a chronic form of bacillary disease Their descriptions agree perfectly with the appearance of a bowel affected by long standing burned-out chronic ulcerative colitis which is to say a scarred thickened bowel wall irregularly contracted with polyplike deformities I have never made a diagnosis of chronic bacillary dysentery on the basis of the proctoscopic examination If such an entity does in fact exist the diagnosis certainly would have to be confirmed by the finding of the causative bacilli in the wall of the bowel

Balantidium coli Ulcerations —Ulcers caused by Balantidium coli have been described but certainly they are not common Balantidium coli is a protozoon found in the intestines of man and other animals It rarely gives rise to symptoms and as a rule is considered to be an innocuous parasite but it may cause bloody dysentery I have seen only one instance of proved dysentery caused by this organism and in this instance the diagnosis was made largely by exclusion In this patient as in those described by Buie a mistaken diagnosis of amebic ulceration had been made The ulcers appeared to be almost identical to amebic ulceration but they were larger that is up to 1 cm in diameter The intervening mucosa was normal Repeated examination of stools as well as biopsy of tissue taken from the edge of an ulcer did not reveal Entamoeba histolytica but did demonstrate Balantidium coli Deaths from infection with this protozoon have been reported in tropical countries but in the United States if the organism occasionally is pathogenic the infection has a mild course

Histoplasmosis —Histoplasmosis is a mycotic disease capable of

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Histoplasmosis —Histoplasmosis is a mycotic disease capable of

Chapter VII

CHRONIC ULCERATIVE COLITIS

SYNONYMS

Synonyms for this disease of the colon are *nonspecific* or *idiopathic chronic ulcerative colitis, ulcerative colitis, colitis gravis, streptococcic ulcerative colitis* and *thrombo-ulcerative colitis*.

Most diseases about which relatively little is known have given rise to a voluminous literature on them, and chronic ulcerative colitis certainly is no exception to this rule. My intention is to recount only known facts about the disease, with particular emphasis on the interpretation of the proctoscopic findings on which a definitive diagnosis rests.

CLINICAL FORMS OF THE DISEASE

For purposes of mutual understanding, those of us at the Mayo Clinic who have to do with the diagnosis and treatment of chronic ulcerative colitis—meaning the physicians in the sections concerned with gastroenterology, diagnostic roentgenology and proctology—have divided the disease into three types.

Type I Chronic Ulcerative Colitis.—This type represents that particular form of the disease which follows a rather definite pattern in development and progress, that is, it begins in the distal part of the rectum and advances with variable rates of speed proximally or orad. *I have seen instances in which the* disease is confined to the distal part of the rectum or to the entire rectum without advancing proximally. In such circumstances the disease remains static, so to speak, indefinitely. *Still, the usual* picture is that of progressive proximal advance. When the disease advances proximally, it usually stops at the ileocecal valve, but in about a third of the cases it crosses over *to involve the terminal* part of the ileum. It is this type I chronic ulcerative colitis that comprises about 85 per cent of the nonspecific forms of colitis.

and for which Bargen[1] and Buie have coined the name "thrombo-ulcerative colitis" on the basis of what they believe to be the etiologic background.

Type II Chronic Ulcerative Colitis.—This form of the disease has two distinctive features that set it apart. First, it never involves any part of the large gut that lies within reach of the proctoscope. Second, it is regional or segmental and affects mainly the right side of the colon, and the diagnosis is made clinically and by roentgen-ray studies of the colon rather than proctoscopically. This type of ulcerative colitis may be suspected on proctoscopic examination; rarely I have seen the distal area of involvement of segmental colitis, a fact which, according to our definition, would remove it from the category of type II.

Type III Chronic Ulcerative Colitis.—This form of the disease is one which presents a different and quite variable proctoscopic picture. Bargen[2] wrote that type III ulcerative colitis has a different etiologic background and that it responds to treatment less satisfactorily than does type I. Type III ulcerative colitis usually involves all of the colon and terminal part of the ileum. Roentgenologically it may be indistinguishable from type I ulcerative colitis. My own opinion, which is not shared by my colleagues, is that "type III chronic ulcerative colitis" is simply a label that can be applied to certain forms of the disease which will not readily adapt themselves to other diagnostic categories. At one time—and this again is my own opinion—type III ulcerative colitis may have been type I, but because of secondary infections, ulcerations and erosions which alter the objective picture, it is impossible to categorize the disease in either of the two types previously described.

Certain other types of colitis for which there is a specific cause, such as tuberculosis, amebic dysentery and venereal lymphogranuloma, are further categorized by Bargen as types IV, V, VI and so on.

To me it seems that the foregoing categories do accomplish one objective: they bring an orderly arrangement to a situation about which relatively little is known. From a clinical standpoint we who have to do with the care of these patients with ulcerative colitis benefit from a better mutual understanding engendered by this system of grouping.

To give the reader some idea of the relative frequency with which we see these different types of colitis in the general type of medical and surgical practice at the Mayo Clinic I shall present figures from the year 1935

In the course of 19 581 proctoscopic examinations carried out in that one year period 420 diagnoses of type I chronic ulcerative colitis were made as compared to fifteen diagnoses of type III ulcerative colitis Fifty one of the patients with type I ulcerative colitis also had polyps as complications and thirteen had rectal stricture as determined proctoscopically

In this discussion the term chronic ulcerative colitis unless otherwise specified will refer to type I chronic ulcerative colitis as previously defined in this chapter

STAGES OF DEVELOPMENT IN TYPE I CHRONIC ULCERATIVE COLITIS

The proctoscopic picture in the various stages of the development of chronic ulcerative colitis consists essentially of the gross changes in the mucosa of the bowel Buie has divided the disease into four stages a classification which has served to bring order out of what formerly was a rather confusing situation

Proctoscopic Picture in Stage 1 —In this stage the mucosa is diffusely inflamed redder than normal and bleeds more readily than it should on slight trauma The view in Plate 14 was taken immediately after the mucosa had been rubbed lightly with a cotton swab There is nothing diagnostic about this stage of the disease The same proctoscopic picture could be presented by the presence of early bacillary dysentery chemical proctitis or acute food poisoning *In fact the condition of an unused segment* of bowel might even present this same picture

Proctoscopic Picture in Stage 2 —The second stage of chronic ulcerative colitis is identified by the formation of minute miliary abscesses in the mucosa According to Bargen's[1] theory of the causation of the disease these minute abscesses are the results of infarcts in the end blood vessels The minute abscesses appear yellowish are slightly elevated and are 1 or 2 mm in diameter (Plate 15) In this stage the mucosa is edematous and reddened This stage of the disease is not seen frequently because it is

evanescent but when it is seen it is difficult to confuse it with any other inflammatory process of the colon Hence once this stage actually is discerned a definitive diagnosis can be made at proctoscopy

Proctoscopic Picture in Stage 3 —The third stage of the disease is the one usually seen in patients who have active type I chronic ulcerative colitis The mucosa appears to be granular somewhat like coarse pink sandpaper The granularity or degree of coarseness will vary from one patient to the next ranging from No 2 0 to No ½ sandpaper (Plates 16 and 17) Bleeding occurs readily on slight trauma and the degree of activity of the colitis is determined by the readiness with which bleeding takes place In addition to surface bleeding on trauma submucosal hemorrhages may be present in a very active phase of the colitis The edges of the valves which normally are sharp become rounded or pulled out by the thickened edematous wall of the bowel In profile the edges of the valves appear irregular Sometimes in this stage larger secondary ulcers occur which may be caused by a secondary type of infection These secondary ulcers may be so numerous and extensive as to make recognition of type I ulcerative colitis difficult

Proctoscopic Picture in Stage 4 —The fourth stage of chronic ulcerative colitis is a period of remission Typically chronic ulcerative colitis is a disease of exacerbations and remissions The proctoscopic picture will vary considerably depending on the duration of the colitis and the frequency and severity of the exacerbations However the main features noted are formation of scars and variable degrees of contracture of the lumen of the bowel (Plate 18) If the patient has had the disease intermittently for years the lumen of the bowel may be contracted to a half its normal caliber or less with complete ironing out of valves rugae and haustrations If this is the case it may be necessary to use a proctoscope of smaller caliber than that commonly employed to get it through the lumen The contracted tubular effect is more apparent in roentgenograms made with barium enema as a contrast medium (Fig 29) Even though there is little or no activity of the colitis the patient may continue to experience diarrhea because the reservoir capacity of the left part of the colon is im

paired Contracture of the lumen generally is more evident in the distal part of the large intestine than elsewhere and of course such is to be expected since the disease starts in the lower part of the rectum and proceeds proximally The serosal aspect of the colon as a rule is surprisingly close to normal even when the disease is of long duration



Fig 29 The colon after the use of a barium enema showing the characteristic tubular deformity absence of haustrations and narrowing of the lumen in the presence of chronic ulcerative colitis Notice more advanced disease in the left side of the colon

PATHOGENESIS

There is rather sharp difference of opinion as to the pathogenesis of chronic ulcerative colitis. I do not purpose to take sides in the controversy. There are essentially five theories as to the inception of the disease.

Infection.—According to Bargen, the most convincing evidence of a bacterial relationship in this condition rests on the presence of a diplostreptococcus which is commonly found accompanying the initial lesions of the first stages of this disease. Bargen wrote further that other common intestinal organisms such as Sphero-phorus necrophorus may play a role as supporting etiologic agents.

Enzyme Theory.—Some investigators feel that the crystalline basic protein enzyme, lysozyme, has some relationship to the progress of the disease. There is evidence that the presence of this enzyme in excess may be a factor in the development of some of the ulceration.

Metabolic Factors.—The fact that there is impairment of adrenal function among patients who have chronic ulcerative colitis as manifested by low quantities of 17-ketosteroids and corticosteroids in the urine, as well as changes in the circulating eosinophils, in all probability is an effect rather than a cause of the disease. In other words, these manifestations are evidences of severe stress and are secondary rather than primary.

Psychosomatic Factors.—In the past few years some writers have laid greater stress on psychosomatic relationships in many inflammatory diseases, but particularly in chronic ulcerative colitis. There certainly is no question that in general the patients who have this disease are nervous and high strung. Here again it is impossible to say whether this psychic factor is cause or effect. Most writers on the subject feel that emotional disturbances or psychic insults are factors in the progression and flare-ups of the disease, but that these factors probably do not cause the condition originally.

Allergy.—Those who subscribe to the theory that allergic factors are concerned in chronic ulcerative colitis feel that bacteria participate in the initial pathogenesis, increasing the susceptibility to further infection, and that subsequently they bring about sensitization of the bowel as an antigen-antibody reaction.

COMPLICATIONS

The complications of chronic ulcerative colitis may be divided for the sake of discussion into (1) *systemic* and (2) *those confined to the large intestine*

Complications Confined to the Large Intestine —In this discussion we shall not concern ourselves with the systemic complications which have been considered thoroughly elsewhere For the sake *of completeness, we shall discuss briefly the complications* confined to the large intestine

Actually only about 15 per cent of all patients with chronic ulcerative colitis have complications but there is a great tendency for the complications to be multiple in a given case[1]

Polyposis —Polyposis probably is the most frequent of any complication occurring in about 10 per cent of all patients with chronic ulcerative colitis Originally at least the lesions are *pseudopolyps or actually mucosal tags Since the colitis as a rule* begins in the rectum this segment of large intestine is the one most frequently involved Sometimes these polypoid mucosal tags appear as straps or bridges of mucosa (Plates 19 and 20) attached to the wall of the bowel at both ends of the bridge so that it is possible to pass an applicator or some other instrument beneath the strap This picture usually is seen in the presence of old burned out colitis The mode of development of this *picture is that during a very active phase of the colitis an isolated* strip of mucosa becomes undermined by ulceration Then as healing and scarring progress the edges turn or roll under, so that what was a strip of mucosa heals in the form of a bridge

Polyps in chronic ulcerative colitis are potentially dangerous *and should be eradicated by fulguration* during remission of the disease Exactly when or how the transition of polyps from inflammatory to adenomatous tissue and then to carcinoma takes *place is unknown It seems to me that the problem warrants* further research which possibly would throw some light on the causation of cancer (Plates 21 and 22)

Carcinoma — *About 2 or 3 per cent of patients who have chronic* ulcerative colitis die from carcinoma of the colon In some cases there seems to be a slow transition from polypoidosis to adenomatosis to carcinoma whereas in others there seems to *develop*

a relentless type of malignant process that is rapidly fatal Thorlakson found twelve instances of carcinoma of the colon and rectum in 182 consecutive colectomies an incidence of 6 6 per cent He also noted that carcinoma in this same group occurred ten to fifteen years earlier than it does in the general population In a well-controlled study carried out by Bargen and co-workers[3] on 1 561 patients with chronic ulcerative colitis they found that cancer occurred thirty times more frequently among patients with chronic ulcerative colitis than among members of the general population of the same age group

Rectal Stricture —Rectal stricture is considered to be the second commonest complication of chronic ulcerative colitis Narrowing of the lumen of the large intestine is the rule rather than the exception after two or three attacks of the disease but what we have particular reference to is localized areas of stricture As mentioned previously several complications may occur in one patient As shown in Plate 23 a stricture as well as a small polyp may be present Strictures may occur any place in the large intestine but since the disease begins in the rectum complications such as stricture have more time to develop in that area The stricture is a manifestation of an attempt at healing and is composed of scar tissue This complication develops in about 9 per cent of patients who have chronic ulcerative colitis Patients with active chronic ulcerative colitis can subsist satisfactorily with a very small lumen through a stricture since the stool is liquid On the other hand I have seen patients whose colitis became inactive with a consequent change in the consistency of the stool from loose to soft or formed so that symptoms of partial obstruction arose from a stricture that caused little or no difficulty when the disease was active If the stricture is diaphragmatic surgical relief can be attempted The use of a warm water retention enema after each stool probably is of some help in making the scarred contracted area more flexible

Anorectal Abscess and Fistula —Anal abscess or fistula certainly is one of the more serious complications of chronic ulcerative colitis It ranks third in frequency among complications being preceded by polyposis and stricture In a study of 871 patients that Smith and I made in 1940 anal abscess or fistula occurred

in seventy three patients (8 4 per cent) It is most difficult to exercise proper judgment in the handling of this complication Overconservatism on the one hand with frequently recurring abscesses and destruction of tissue may result in anal incontinence or anorectal stricture and possibly lead to the need for ileostomy On the other hand an attempt to eliminate the fistula by surgical intervention may result in an unhealed indolent wound which may persist for years and cause great disability With respect to surgical intervention a few definite statements can be made (1) during an active phase of the disease conservatism is desirable and surgical treatment should be limited to incision and drainage of acute abscesses (2) during remissions of the disease it may be good judgment to perform fistulectomy in certain selected cases Healing of the wound may be promoted by the use of roentgen therapy or ultraviolet irradiation—but it may be particularly enhanced by making sure that there is adequate drainage Overhanging edges and excess granulations should be removed as indicated when they occur

Hemorrhoids —Whether hemorrhoids should be considered as a complication of chronic ulcerative colitis or a coincidental occurrence is beside the point The two conditions frequently coexist and the main reason for discussing the question here is that some patients who have early chronic ulcerative colitis are unwittingly operated upon for hemorrhoids much to the chagrin of the surgeon when he discovers that symptoms of bleeding persist after the operation This of course further emphasizes the importance of proctoscopy before any anal operation is undertaken In the previously referred to study by Smith and me 3 7 per cent of the 871 patients who had chronic ulcerative colitis said that their symptoms of bleeding and rectal discharges had been noticed shortly before or at least became more pronounced after the operation for hemorrhoids

It should be borne in mind that diarrhea is not necessarily always a symptom of chronic ulcerative colitis Actually some patients who have ulcerative colitis in an early stage or whose disease at least is confined to the distal rectal mucosa may complain of constipation and it is such patients who may be unwittingly operated upon for hemorrhoids

Anal Fissure and Anal Ulcers—Painful anal lesions such as anal fissure and anal ulcers occur in about 5 per cent of patients who have chronic ulcerative colitis Here again it is certainly best to avoid surgical intervention during an active phase of chronic ulcerative colitis It is preferable to resort to palliative procedures Measures which may be effective in relieving pain are the use of topical anesthetic ointments or suppositories If the latter are prescribed the patient should be instructed how to use them (see Chapter XXIII)

Another effective procedure for the relief of pain caused by anal fissure or anal ulcer is the use of hot anal irrigations to wash out the infected secretions in the ulcers and thereby relieve the muscle spasm (see Chapter XXIII) This procedure will require about five minutes On some occasions such care will promote the healing of an indolent ulcer Often nature will heal a fissure by producing an abscess beneath its overhanging edge or sentinel pile with rupture of the abscess and the consequent production of a subcutaneous fistula The fissure can then drain and healing will take place In some instances it may be the part of good judgment to remove the sentinel pile or overhanging edge after it has been infiltrated with a local anesthetic agent In this way the fissure can drain and healing takes place Here again radical excision of the fissure or ulcer should be done only when the colitis is inactive

Anal Incontinence—It is a frequent assumption that all patients with chronic ulcerative colitis who have anal muscular incontinence are in such a predicament because of an unwarranted anal operation such as a fistulectomy This is not necessarily true Many patients who have never undergone any anorectal operation are completely incontinent because of general debility and weakness attendant on the disease while many others will have sustained so much destruction and scarring of anal musculature by the repeated formation of abscesses that any muscular action is completely absent Most patients who have anal incontinence and active chronic ulcerative colitis do much better if ileostomy and colectomy are carried out for them

Perforation of the Colon—This of course is a serious complication According to Bargen in half the cases the site of perforation

is the sigmoid while the next most common site is the cecum

Massive Hemorrhage—Massive hemorrhage occurs in 1 per cent of cases or less By and large chronic ulcerative colitis is a problem for the internist and gastroenterologist Operation should be limited largely to those persons who have complications such as localized perforation polyposis stricture severe hemorrhage anal abscess and fistula and carcinoma of the colon

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Chapter VIII

PROCTOSCOPY IN THE DIAGNOSIS OF AMEBIASIS

INCIDENCE OF THE DISEASE

Infestation of the large intestine with Entamoeba histolytica is now considered to be a *universal infection,* rather than simply a tropical disease. About 5 to 10 per cent of the population of the United States harbor the parasite. Most authorities on the subject agree that many persons are hosts to the parasite but are entirely asymptomatic and that the occurrence of symptoms depends on the virulence of the parasite, resistance of the host and other factors.

DIAGNOSIS

The absolute diagnosis of amebiasis is accomplished only when Entamoeba histolytica has been identified in the stools, tissues or bodily discharges. Because of the possible presence of at least four other species of Entamoeba and several other protozoa, identification of Entamoeba histolytica may be very difficult. Fairly commonly, examination of the rectal discharges will not be sufficient for identification of the parasite. Therefore, resort to all diagnostic procedures applicable should be considered. The value of proctoscopy in the diagnosis of amebic dysentery is considered by many as being controversial. Cooper and I[1] therefore set out to try to find the answers to certain questions. To accomplish this, we studied the records of 115 patients who were proved to have amebic dysentery.

Frequency of Amebic Ulcers at Proctoscopy.—What percentage of patients who were found to have Entamoeba histolytica by examination of stools were found to have ulceration of the lower part of the bowel at proctoscopy? Manson-Bahr wrote that in a series of 258 cases in which sigmoidoscopy was done, amebic ulcers

and other characteristic lesions were found in 234 (90 per cent) In twenty four (9 3 per cent) of the 258 cases the mucosa of the lower part of the bowel had a normal appearance He concluded that routine sigmoidoscopy has proved its value as a means of securing a positive diagnosis

In our study of 115 cases we did not make any attempt to classify the disease into the acute or the chronic phases of amebic colitis All the patients had sufficient symptoms referable to the lower part of the bowel to warrant examinations of stools and all underwent sigmoidoscopy and roentgenoscopic examination of the colon

In twenty four (20 8 per cent) of the 115 cases there was ulceration of the lower part of the bowel typical or suggestive of amebic ulceration It must be remembered that the type of amebiasis observed at the Mayo Clinic is somewhat different from the type observed in other sections of the world in that most of the patients seen have long standing amebiasis that has been treated This explains the relatively low percentage of gross ulcerations noted

As to the location of the ulcers it did not seem to us that there was any predilection for the edges of the valves as has been suggested frequently by other writers on the subject

Frequency of Amebic Ulcers on Proctoscopy but Negative Results of Stool Tests —*In how many cases was there typical or suggestive ulceration in the lower part of the bowel but repeated negative results of examination of the stools so that the diagnosis ultimately was afforded by study of swabs or scrapings from the ulcers?* In the 115 cases studied we found two (1 7 per cent) in which the situation was as noted above that is repeated examinations of stools gave negative results but study of scrapings from rectal ulceration in one case and biopsy of tissue from an ulcer in the other case afforded the means by which Entamoeba histolytica was found In seventy seven of Manson Bahr s 258 cases in which there was ulceration of the lower part of the bowel examination of stools gave negative results and the active amebas were recognized only after study of scrapings from the ulcers Rodaniche and Palmer reported one case in which the patient had typical rectal ulcers and in which repeated examinations of the fecal mass gave negative results but study of repeated proctoscopic swabs

give positive results It would therefore seem that the following statement is justified *Given a patient suspected of having amebiasis but one in whom examination of stools gives negative results, direct examination of the bowel by means of proctoscopy should be undertaken with the idea of obtaining positive evidence from the ulceration*

Frequency of Coexisting Anal Inflammatory Lesions —*How frequently do anal inflammatory lesions such as anal abscesses and fistulas occur in amebic dysentery?* Smith and I have pointed out the relative frequency with which anal abscess and fistula occur in chronic ulcerative colitis and regional ileitis We have not found this frequency of occurrence to obtain in amebic colitis One of the 115 patients in the series I have mentioned had an ischioanal abscess and one had an anal fistula This incidence (1 7 per cent) is in striking contrast to an incidence of the same condition in more than 30 per cent of patients with regional ileitis in a similar study and an incidence of 8 4 per cent in patients with chronic ulcerative colitis

Frequency of Amebic Granulomas —*What other lesions of the lower part of the bowel were observed in association with or as a complication of amebiasis as determined by sigmoidoscopy?* One of the 115 patients had an *amebic granuloma* in the lower part of the sigmoid The clinical significance of this lesion lies in the fact that it may be easily confused with other tumefactive lesions and particularly malignant lesions The differential diagnosis was made in this particular case by the finding of the parasite in the stools and by histologic study of specimens of tissue removed at the time of proctoscopy

OTHER COEXISTING LESIONS

Adenocarcinoma —However the finding of the parasite in the stools alone is not sufficient to rule out the presence of a malignant lesion as indicated by two of the patients in the series who were found by examination of stools to have amebas but who at proctoscopy also were found to have *adenocarcinoma* in the region of the rectosigmoid This complication further emphasizes the importance of proctoscopy even though the parasite has been found in the stool One of these patients who had a carcinoma

that was not palpable by digital examination had received vigorous treatment with amebicides Then when the symptoms did not disappear, this patient was referred for *proctoscopic examination* which disclosed the carcinoma in the lower part of the sigmoid

Polyps —Two patients were found to have single sessile *polyps* in the sigmoid It is possible that these polyps or as some authors describe them pseudopolyps are similar in formation to the polyps which occur in chronic ulcerative colitis The polyps were destroyed easily by fulguration

Rectal Stricture —This condition was found in one of the 115 cases of amebic dysentery The patient had had the disease for many years The stricture did not resolve after intensive treatment *Two members of the group had scarred contractions of* the anus

GROSS APPEARANCE OF AMEBIC ULCERATION

In the earliest stage of development the future site of an amebic ulcer at first glance looks like a minute polyp It is an elevated reddened area 3 to 5 mm in diameter and the center of the polypoid area may be yellowish Actually this center zone is a tiny abscess containing the parasite and degenerated tissue If the cap of the abscess is wiped away with a cotton swab a minute *ulcer 2 or 3 mm in diameter* will be disclosed It has a punched out or umbilicated appearance (Plate 12) As has been said this ulcer contains the parasite which tends to undermine the adjacent mucosa (Fig 30) giving the lesion the elevated reddened appear

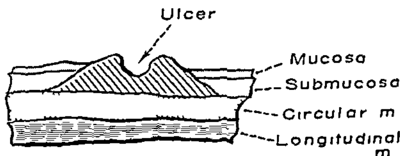


Fig 30 The mechanics of amebic ulceration The inflammatory reaction tends to undermine the adjacent normal mucosa making it appear elevated and reddened—thus the umbilicated appearance

ance It is by means of these ulcers that the proctoscopist can assist in the diagnosis by taking swabbings or scrapings from them or by removal of an entire ulcer with a biopsy forceps

When the typical amebic ulcer is seen it is virtually diagnostic but in my experience with the chronic or long standing type of amebiasis seen at the Mayo Clinic this so called typical ulcer is the exception rather than the rule Consequently we do not often see it Manson Bahr wrote that often the only signs of abnormality are small flame shaped hemorrhages in the center of which Enta moeba organisms may be demonstrated

Many times it has been my experience that after I have written a report of proctoscopic findings describing ulcers suggestive of amebic infestation subsequent results of repeated examinations of stools are negative Similarly study of swabbings or of tissue removed from an ulcer and surrounding tissue does not disclose the parasite The ultimate result in some cases is that subsequent roentgenologic studies of the colon or small bowel in some of these patients will demonstrate segmental chronic ulcerative colitis or regional ileitis In still other cases results of all studies will be normal and it will not be possible to explain the presence of the ulcers

It has been my experience further that the proctoscopic exam ination rather often will disclose a perfectly normal mucosa even though examination of the stools may already have demonstrated Entamoeba histolytica This is not surprising since as I have indicated it is generally accepted that healthy persons may have the parasite without knowing it and without the production of harm

Currently oxytetracycline (terramycin) is thought to be the most effective agent for elimination of the parasite Chlortetra cycline (aureomycin) also is of value According to most authors however antibiotic agents exert no apparent effect on extra intestinal amebiasis such as hepatic infection

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Chapter IX

PROCTOSCOPY AS AN AID IN THE DIAGNOSIS OF REGIONAL ILEITIS

It may seem somewhat paradoxic that the proctoscopist may be the first one to suspect the presence of regional ileitis in a given case However those of us who do many proctoscopic examinations have learned to interpret certain findings combined with an index of awareness so to speak as pointing to the possibility that ileitis may be present It is true that the aroused suspicions must be confirmed by roentgen ray studies of the small bowel However I have observed certain instances in which the suspicion was not confirmed by roentgenograms but was borne out when the patient underwent exploratory laparotomy

LESIONS OCCURRING IN THE LOWER BOWEL SUGGESTIVE OF ILEITIS

Ever since 1932 when Crohn and his co-workers established regional ileitis as an entity we have been impressed with the frequency of occurrence of certain anorectal manifestations of the disease In 1943 Smith and I reviewed the records of 114 consecutive cases of regional ileitis in which the diagnosis had been made by roentgenologic examination and confirmed by surgical exploration and in which preoperative sigmoidoscopic examination also had been done The purpose of this review was to note the *lesions that occur in the lower bowel which might be suggestive of the disease* We found the following conditions to be suggestive or characteristic particularly if they occurred among patients in the appropriate age group or among those who had any vague intestinal disturbance (1) *Anal abscess or anal fistula or both* (2) *an extrarectal mass* and (3) *anal ulceration or anal contraction or both* Since then I have seen two patients who had

an ileorectosigmoidal fistula which subsequently was verified at the time of operation Preoperatively at proctoscopic examination lack of mobility of the bowel was noted in the rectosigmoidal area and a tuft of granulation tissue was seen at the site of the fistula Hence to the three manifestations noted above should be added a fourth *ileorectal or ileosigmoidal fistula* One other, or a fifth manifestation was noted postoperatively in some of these patients after *resection of the involved portion of ileum* and performance of a short-circuiting procedure that is *ulceration of the lower bowel*

Anal Abscess and Anal Fistula —It is important to keep in mind that the factor which first of all will bring some of these patients to a physician is some type of anorectal abscess or fistula This was the factor which impelled eight or 7 per cent of 114 patients studied by Smith and myself to visit their physicians The ileitis was so mild that the patient was not conscious of any intestinal disturbance We performed fistulectomy in six of the eight cases without being aware or suspicious of the presence of ileitis Regional ileitis was discovered roentgenologically within a year or two when the intestinal disturbance appeared or became more marked A total of thirty six or 31 6 per cent of our 114 patients had anal abscess anal fistula or anal scarring and deformity with a history of having undergone an operation for these conditions within a three year period before their visit to the Mayo Clinic Penner and Crohn have repeatedly pointed out this tendency toward fistulization in the presence of regional ileitis and the fistula may involve not only an adjacent viscus or the abdominal wall but also the anorectal area Eight or 11 per cent of Penner and Crohn s patients reported upon in 1938 had anal fistulas Alertness to the possibility of the coexistence of anal fistula and regional ileitis will uncover more instances of the disease

Some will recall that before Crohn established regional ileitis as a separate entity the disease in many cases was mistakenly diagnosed as tuberculosis and the teaching was that we should suspect tuberculosis in patients who had anal fistulas This aspect of the problem will be discussed further in that part of the text which deals with anal fistula and tuberculosis We now teach

our graduate students that the finding of an anal abscess or anal *fistula or the report that surgical treatment has been carried out for these conditions in a young adult person with any vague intestinal disturbance and especially one whose intestinal symptoms persist after appendectomy should alert the physician to the possibility of regional ileitis*

Extrarectal Masses — A mass was palpable in the rectovesical or recto uterine space in twenty patients (17 5 per cent of the 111) This mass represents a loop or loops of involved ileum perhaps complicated by pelvic peritonitis and sometimes by fistulization into the bladder rectum sigmoid or uterus As indicated in Chapter 23 (extrarectal or extrinsic masses) in this area there are many conditions which are more frequent causes of masses outside the bowel than regional ileitis Here again alertness on the part of the examiner to the possibility that the mass may be caused by ileitis sometimes will lead to that diagnosis which may be correct At palpation the examiner soon senses that there is something distinctly different between such an extrarectal mass in the presence of regional enteritis and a mass caused by carcinoma or diverticulitis In the presence of ileitis the mass is relatively soft and nontender *Our teaching is that a nontender soft extrarectal mass in a young adult person in whom the mucosa of the lower bowel is normal should alert the examiner to the possibility of ileitis*

Anal Ulceration and Anal Contraction —Numerous conditions can cause anal ulcerations and there is nothing grossly characteristic about anal ulcers that occur in patients with ileitis except that the lesions tend to be chronic and indolent with excess granulation In contradistinction to the ulceration of an anal fissure which usually occurs in the midline posterior anal ulcers secondary to ileitis tend to occur on the lateral anal walls As a rule these ulcers heal spontaneously during a remission of the disease or after the affected portion of ileum has been removed If the ulcer has an overhanging ledge that obstructs drainage the ledge and excess granulations should be excised surgically As healing takes place the resulting scar and infection may cause a variable degree of contracture In view of the nature of the infected ileal content which is transported to the anal region and the vulner

ability of the anal crypts to infection inflammation and ulcerations among patients who have regional ileitis should be fairly common Ulcers of the type in question occurred in nine or 7 8 per cent of the 114 patients whose records we studied

Ileorectal and Ileosigmoidal Fistulas —These fistulas probably occur much more frequently than would be detected by proctoscopy They are most likely to be demonstrated roentgenologically or at the time of operation However on two occasions I suspected and reported my suspicion of regional ileitis in patients whose small bowel appeared normal in roentgenograms but who at the time of exploratory laparotomy, were found to have a short loop of involved ileum deep in the pelvis with formation of fistulas into the rectum in the region of the cul de sac or rectovesical space What had caused me to suspect ileitis at the proctoscopic examination? In each instance there was a history of vague abdominal distress in a patient with a mild diarrhea the patient was in the appropriate age group and at proctoscopy I visualized a tuft of granulation tissue in a zone of fixed rectosigmoid whereas the rest of the bowel that was within range of the proctoscope was normal

Ulceration and Bleeding of the Bowel After Short circuiting Operations —It is a well known fact that the tendency of regional ileitis to recur after operations is relatively high At proctoscopic examination done from one year to two years after resection of the diseased portion of ileum ulceration at or near the site of ileosigmoidal anastomosis has been noted on several occasions The ulcers are relatively large meaning 2 to 3 cm in diameter and they are superficial with irregular margins In most of the patients who have ulcers and in some who do not the mucosa of the large intestine bleeds more readily than normal If either observation—ulceration or ready mucosal bleeding—is made the possibility of a recurrence of ileitis should be considered Sometimes the ulcerations are tiny with a gross appearance not unlike amebic ulcers

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Chapter X

POLYPS OF THE COLON

DEFINITION

Polyps of the colon have been described aptly by some writers as "true benign neoplasms," and although it may be difficult in view of the philosophy of pathologic teachings to accept all neoplasms as being benign, the description just given does point up the accepted fact that certain polyps occurring in the large intestine are potentially malignant. The word *polyp* is derived from the Latin *polypus*, meaning many feet, and is defined as "a smooth, pedunculated growth from a mucosal surface." By virtue of common usage, the word "polyp" as applied to the colon has come to mean a precancerous lesion, and the lesion so designated should be separated from the various other enlargements in the colon which may project into the lumen and resemble polyps.

CATEGORIES

Many methods have been used to classify polyps of the colon, embodying such terms as "single or multiple," "familial," "sessile or pedunculated," "discrete or diffuse," "malignant or benign."

For purposes of this discussion we have decided to divide polypoid disease of the colon into five main categories: (1) *adenomas*, (2) *multiple adenomatosis (familial type)*, (3) *Peutz-Jeghers syndrome*, (4) *villous adenomas*, and (5) *polypoid or inflammatory polyps*.

Adenomas.—Adenomas of the colon are the most common benign tumors of the large intestine. They occur singly or multiply in patients of all ages and in all portions of the colon. They originate in the glands of Lieberkühn and generally are considered to have malignant potentialities.

Evidence for Adenoma-carcinoma Sequence.—To understand this problem better, the development of cancer from the earliest

stages must be considered Certain definite evidence has accumulated during the past two decades which indicates that polyps (adenomas) of the large intestine are the forerunners of cancer of that organ Whether or not all carcinomas of the colon originate from polyps the element of time involved in the transformation and the mechanism by which it is accomplished are unknown or debatable factors Some factors are known however which strongly support the existence of an adenoma-carcinoma sequence in the development of cancer of the colon These factors are listed in the order of their significance[4]

1 Polyps and Carcinoma of the Colon Frequently Are Associated — At sigmoidoscopy we frequently see one or more small polyps situated adjacent to a carcinoma So frequent is this observation that we speak of lesions in such an association as sentinel polyps (Plate 56) If a polyp is observed and no carcinoma is found within reach of the sigmoidoscope roentgenologic study of the colon is indicated to determine whether or not there are more polyps or a carcinoma above the level visualized with the sigmoidoscope

For further substantiation of the polyp-carcinoma association it is noted that about *18 per cent of all sections of the large intestine removed because of carcinoma are found to have one or more polyps adjacent to the carcinoma*

2 Close Parallelism Between Location of Polyps and Location of Carcinoma in Various Segments of Large Intestine —From the standpoint of prevention of cancer it is fortunate that about 70 per cent of all polyps of the large intestine are within reach of the average sigmoidoscope We physicians should take advantage of this fact by using the sigmoidoscope more frequently than we do Likewise about 70 per cent of all carcinomas of the large bowel can be visualized with the sigmoidoscope (Fig 31)

3 Close Parallelism Between Carcinoma and Polyps in Factors of Age and Sex Distribution of the Affected Patients —The ages of thirty to seventy years which have been called the cancer years constitute the span in which polyps as well as carcinoma of the large intestine are most frequently found It should not be forgotten however that one of the commonest causes of rectal bleeding in infancy and childhood is a polyp or polyps of the

colon Polyps and carcinoma parallel each other in the distribution according to sex in a ratio of about three males to two females

4 *Untreated Polyps Show Superimposition of Carcinoma at Subsequent Examination* —Several instances have been described in which adenomas were known to exist but were left untreated the end result being that a carcinoma subsequently developed where the polyp had been

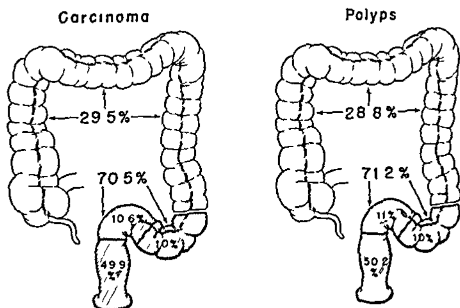


Fig 31 The close parallelism between the location of carcinoma and the location of polyps in various segments of the large intestine (Reproduced with permission of the publishers from Jackman R J Neibling H A and Waugh J M Carcinoma of the Large Intestine Diagnostic Error in Relation to Location of the Lesion *J.A.M.A* 134 1287 1289 [Aug 16] 1947)

5 *Familial Multiple Polyposis of the Colon Involves High Rate of Complication by Adenocarcinoma if Left Untreated* — Familial multiple polyposis is relatively rare but when it is found either complete or partial colectomy with performance of ileosigmoidostomy and destruction of the polyps in the rectum and lower part of the sigmoid by fulguration should be done

6 *Polypoidosis and Subsequent Carcinoma Constitute Fairly Common Complications of Chronic Ulcerative Colitis* —Various authors present figures to show that in 10 to 20 per cent of cases of chronic ulcerative colitis polyps of the colon develop during

the course of the disease and that many of these polyps progress to adenocarcinoma It is estimated that adenocarcinoma of the colon is the cause of death in about 2 5 per cent of cases of chronic ulcerative colitis

7 *Histopathologically Many Small Polyps Which Grossly Appear To Be Benign Show Adenocarcinomatous Changes in Cellular Structure* —With the foregoing evidence there is substantial unanimity of opinion that most if not all carcinomas of the colon begin as polyps To practice prevention of cancer as it pertains to the colon the polyps should be found and destroyed

Symptoms and Signs —The commonest sign is passage of blood from the bowel but this sign by no means is peculiar to the presence of polyps In fact most small polyps and many early carcinomas of the colon are entirely asymptomatic Patients between the ages of thirty and seventy years who had no symptoms referable to the large intestine and who had undergone sigmoidoscopy as part of their routine annual physical examination have been found by various authors to have polyps of the lower bowel (or in some instances early carcinoma) in 10 to 20 per cent of the cases

Incidental Finding of Polyps at Necropsy —In a series of 2 784 necropsies done at the Mayo Clinic in a five year period (1935 to 1939 inclusive) in which the patients had died of some other condition not related to the colon (Table I) 14 7 per cent of the 1 757 males in the group and 9 per cent of the 1 027 females were found to have polyps of the large intestine It should be remembered that this study included all ages from the newborn up to the age of ninety years The highest incidence was found in the age group of sixty through sixty nine in which 26 4 per cent of 421 men and 15 4 per cent of 195 women were found to have had polyps (Table I) I believe it could well be assumed that the polyps eventually would have developed into carcinomas had not these patients succumbed to some other disease

Diagnostic Procedures Available for Discovery of Polyps —If it is kept in mind that 70 per cent of all polyps of the large intestine are within reach of the average sigmoidoscope that most small polyps do not give rise to any symptoms and that the incidence of polyps is greatest in the sixth seventh and eighth

TABLE I
INCIDENTAL FINDING OF POLYPS IN 2,784 NECROPSIES
ACCORDING TO AGE AND SEX OF PATIENT
MAYO CLINIC 1935-1939 INCLUSIVE*

Age Years	*Necropsy*		*Polyps Found Cases*			
			Number		*Per Cent*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
0-9	115	72	2	1	1.7	1.4
10-19	66	43	1	3	1.5	7.0
20-29	86	83	4	1	4.7	1.2
30-39	152	114	7	7	4.6	6.1
40-49	278	187	27	10	9.7	5.3
50-59	430	208	56	22	13.0	10.6
60-69	421	195	111	30	26.4	15.4
70-79	177	105	44	16	24.9	15.2
80-89	32	20	6	2	18.8	10.0
Total	1,757	1,027	258	92	14.7	9.0

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decades of life the problem and the attack upon it become quite clear Many authors advocate annual routine sigmoidoscopic examinations for all patients during the so-called cancer years of the span I have indicated If polyps are found they should be removed either by fulguration or by excision Roentgenologic studies of the colon also should be made to determine the presence or absence of polyps situated higher up in the colon Whether or not it is practicable to perform sigmoidoscopy for all patients of the age range in the three decades concerned is another question but I do feel that from the standpoint of prevention of cancer there is no relatively simple diagnostic procedure that is more revealing than sigmoidoscopy

In almost all instances sigmoidoscopy should precede the roentgenologic studies of the colon For some strange reason the average practitioner usually turns first to roentgenologic studies of the colon when it is suspected that polyps are present It should also be borne in mind that rectal bleeding is a symptom common to many lesions of the rectum colon and anus and that this type of bleeding is not peculiar to any one lesion

Most lesions that feel like a polyp on digital examination of the rectum actually are hypertrophied anal papillae The papilla is readily palpable because it is quite firm It originates from a papilla of Morgagni and therefore is within easy reach of the examining finger Enlarged anal papillae will vary in size but sometimes one will become as large as a golf ball and prolapse through the anus (Plate 73) Objectively they are easily distinguished from an adenomatous polyp because they are covered with skin—meaning stratified squamous epithelium—whereas polyps are mucosal in origin Hypertrophy of these anal papillae is caused by repeated episodes of inflammation edema and fibrosis with gradual enlargement They do not have malignant potentialities as do adenomatous polyps

Most small adenomatous polyps are soft and not easily palpable unless the touch of the examiner s finger is very sure

So often does the clinician err in his note on the proctoscopic referral card in writing rectal polyp when the lesion actually is an enlarged papilla that we in the Section of Proctology facetiously speak of this lesion as the clinician s polyp

Histopathologic Aspects —The term adenomatous pertains to microscopic aspects of the lesion but the miscroscopic features of so-called adenomas will vary considerably Some consist of proliferating glandular elements with an almost normal appearance whereas others may have a complex structure with reduplication of glands and tall cells with hyperchromatic nuclei which lose their basal location

Certainly what clinically would appear to be a benign adenomatous lesion might prove to be different from that histologically A study of four pedunculated polyps obtained from Dr L B Woolner all of which clinically were thought to be adenomatous bears out the preceding statement (Fig 32 36)

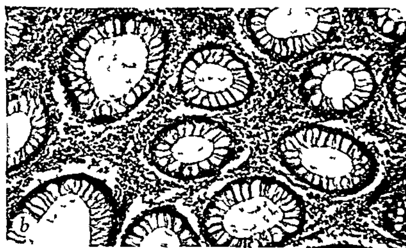
Although the situations presented in Figures 32 through 36 are exceptional they do emphasize what some authors mean when they speak of the malignant potentiality of these lesions The figures further point out the difficulty of decision as to the proper course of treatment for a given polyp No matter how much experience the proctologist has had the gross proctoscopic appearance of such a lesion sometimes may be deceptive

Selection of Patients for Various Methods of Treatment—Various methods are used *to remove polyps* from the colon such as fulguration, electrocoagulation with a snare and transcolonic excision It has been proposed that the one disadvantage of fulguration in comparison with *electrocoagulation with the snare* is that since fulguration destroys the polyp tissue is not available for microscopic examination I certainly have no intention of being facetious when I say that *in my opinion the absence of* tissue for pathologic study in such an instance more frequently is an advantage than a disadvantage That is if a decision were to be made on the basis of microscopic findings alone as to which lesion should be treated radically and which should be treated by conservative methods such as fulguration very likely that decision would be to treat most of them radically The reason is that the cellular configurations of most polyps exhibit features *characteristic of potentially malignant changes* Even so the fact that a polyp manifests microscopic features of malignancy does not mean that it cannot be eradicated by fulguration Actually *six factors should be considered before the decision is made as to* whether or not conservative measures are feasible

1 Size—In general it has been our practice at the Mayo Clinic to fulgurate most small polyps meaning those up to 5 or 6 mm in diameter at the time of the original examination without the taking of a specimen of tissue for biopsy (Plate 24) The patient is advised that a polyp was discovered during the examination and that the polyp was removed by fulguration (Plate 25) It is explained that it is *highly probable that he will never have* any further difficulty at the site from which the polyp was removed but that since other polyps might arise elsewhere in the large intestine and *since it is generally considered* that such polyps have malignant potentialities he would be wise to undergo a protoscopic examination annually In presenting this counsel to the patient a sympathetic understanding and individualized approach should be used This is additionally important in view of the fact that some of the cancer-detection *centers in this country* have been accused of creating many instances of cancer anxiety neurosis Whether or not this criticism is justified I do not know



Fig 32 *a* Sagittal section (x3) of pedunculated polyp which is grossly adenomatous *b* Higher magnification (x120) of the same polyp It has a typically adenomatous structure The nuclei are basal in position and regular in size



After these small polyps have been fulgurated the patient proceeds to the roentgenologic studies of the colon or to whatever other examinations are indicated This system has proved to function very well

Most *pedunculated polyps* such as in Plate 26 regardless of size and location are amenable to fulguration if the entire polyp and its pedicle can be exposed If the polyp is situated above the peritoneal reflection it must be kept in mind that the serosa may be inverted or dimpled into the stalk Anyone who has done a large number of proctoscopic examinations and fulgurations sooner or later will encounter what Nesselrod described as the elusive or phantom polyp It is one which has a long pedicle and which lies in the distal part of the sigmoid colon, just within or slightly proximal to, the usual range of the proctoscope Because this polyp has a long pedicle its position may vary considerably in the bowel On occasions I have seen a pedunculated polyp the body of which could be visualized easily with a 25-cm proctoscope but which at subsequent examinations was difficult to reach with a 40-cm proctoscope

Since bleeding is a possible complication after any fulguration these elusive polyps usually are best treated by transcolonic excision rather than by fulguration The reason is that should postfulguration bleeding occur from the pedicle the site of bleeding might be inaccessible to the proctoscope

Whether *larger sessile polyps* are fulgurated or are treated by conservative methods depends principally on the experience and judgment of the examiner Ideally although not necessarily for the performance of thorough fulguration the site of the lesion should be below the peritoneal reflection in the hollow of the sacrum The sessile polyp shown in Plate 27 was successfully fulgurated by the fractional method

2 *Location of Lesion*—The site of the lesion is a factor in decision as to what treatment will be instituted If the lesion is located on the posterior rectal wall treatment can be more radical and therefore fulguration can be done more boldly

3 *Consistency of Lesion*—The consistency of the lesion is a factor that will enter into the judgment in decision as to what treatment is best Any sensation of firmness of the polyp as im



Fig 33 *a* Sagittal section (×3) of another pedunculated polyp grossly considered to be an adenoma *b* Higher magnification (×90) of the same polyp The structure in this view is adenomatous but the nuclei are somewhat elongated and hyperchromatic On the basis of the cellular structure if the quality of benignity has degrees this tissue would have to be considered to be less benign than the polyp shown in Figure 32*a* and *b*



parted at digital examination or the feel of it with the end of the proctoscope should arouse suspicion of *malignancy* and a specimen of tissue should be removed for biopsy

4 *Mobility* —Mobility of the lesion is a requisite if *fulguration* is to be considered Lack of mobility or any *motion of the wall* of the bowel synchronous with motion of the *lesion ought to* suggest that conservative treatment is not *indicated*

5 *Condition of Adjacent Mucosa*—Hyperplasia of adjacent mucosa is not a contraindication to fulguration but *it should be* remembered that polyps tend to form in areas of *hyperplasia*

6 *Microscopic Findings*—What is seen under the microscope is important in making the decision as to the best method of treatment but more important are the judgment and experience of the examiner In my opinion the histopathologic picture has proved to be too much of an influencing factor in decision as to the best plan of treatment to follow Many patients who could be treated by conservative methods—meaning fulguration or local excision—undergo some radical surgical procedure because the sections of tissue removed from the lesion for biopsy were seen to contain malignant cells in situ It is the rule rather than the exception that most large polyps will exhibit microscopic evidence of low grade malignant changes in addition to the adenomatous picture but this in itself certainly should not be a deterrent to conservative treatment in selected cases I am fully aware of the inherent dangers of advocating conservatism in the treatment of these equivocal polypoid lesions which may contain frankly malignant cells especially when the dictum always has been that the most radical treatment is the best treatment in such cases Nevertheless experience has shown that most such lesions are slow of growth and slow to invade It is true that there is an element of chance in advocating conservatism in the treatment of such lesions On the other hand it is equally true that the risk of morbidity and mortality is considerable even in skilled surgical hands if the alternative treatment of radical resection is carried out

Actually the microscopic findings should constitute simply one of several factors entering into the deliberations as to the best plan of treatment for a given lesion

Treatment—The technic of fulguration or electrodesiccation







Fig. 31 *a* Still another pedunculated polyp (×1) also grossly benign *b* One portion of this same polyp inside the circle (shown in *a*) showed an infiltrative grade 2 adenocarcinoma (×300) *c* Higher magnification (×300) of the same polyp There is a little further shift from the benign to the malignant The nuclei are more elongated and hyperchromatic a picture which might be considered to be that of a grade 1 adenocarcinoma *in situ*

has been adequately described by other authors and since this work has to do principally with diagnosis fulguration will be dealt with by a few general remarks

Anyone who does proctoscopy should have available some type of electrosurgical equipment to eradicate tiny polyps or mucosal excrescences Fulguration should be carried out when the polyp is first found that is while it is still in the field of the proctoscope since it may be very difficult to find such a minute lesion again

I use an Oudin or monoterminal type of current and I prefer electrodesiccation to the diathermy snare principally because bleeding is less likely to occur when electrodesiccation is employed

In general most electrosurgical procedures carried out in the lower bowel constitute an office procedure and do not require anesthesia since the operative field has a sympathetic rather than a sensory nerve supply

Most electrosurgical or fulgurating units will vary somewhat in such factors as the distance the spark will jump from electrode to polyp the depth of the burn and so on It is prudent therefore for the proctologist to become acquainted with new equipment by testing it out on a piece of meat

Complications of Fulguration —In my experience fulguration of small adenomas or mucosal excrescences has never been attended by any untoward effects Neither have I seen *perforation* as a complication but the possibility of perforation is obvious when fulguration is carried out above the peritoneal reflection *Hemorrhage is a definite complication* it occurs in about 2 per cent or less of patients The hemorrhage is most likely to occur three to five days after fulguration when the slough is separating The patient should be instructed as to this possibility but in such a way that he will not become unduly alarmed He should be told what to do if bleeding occurs

In my experience most postfulguration bleeding severe enough to be classified as hemorrhage has ceased by the time the fulgurated site is inspected The colon of the patient has become filled with blood and the patient became aware of the bleeding when he defecated and passed a great quantity of clotted blood If bleeding is not active by the time the site is inspected rest in bed and observation for signs of further bleeding ought to be

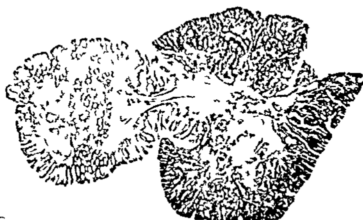


Fig 35 *a* Sagittal section of another pedunculated polyp (x7) Grossly it was benign resembling those in Figures 32*a* 33*a* and 34*a* *b* Higher magnification (x150) of sections made from the stalk of the polyp shown in *a* discloses invasive grade 2 adenocarcinoma throughout



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were the chief symptoms Thirty four patients said that they had had blood in the stools but had not had any diarrhea Fourteen patients had had diarrhea or frequent loose stools but had not noticed associated blood Forty two sought medical care because of both diarrhea and bleeding Thus one or both of these important signs of disease of the colon were present in ninety (95 per cent) of the ninety five patients Five patients said that they had not had any symptoms referable to the colon and they were examined only because of a history of diffuse polyposis in the immediate family Additional symptoms reported were excessive amounts of mucus in the stools attacks of cramping abdominal discomfort and pain One patient who had definite symptoms of intestinal obstruction was found to have a carcinoma of the rectosigmoid superimposed upon diffuse polyposis

The severity of the bleeding and diarrhea varied greatly in different cases In general on the basis of these symptoms alone diffuse polyposis was indistinguishable from diffuse polyposis complicated by carcinoma It follows that it could not be accurately determined on the basis of the symptoms when malignant degeneration occurred In one case a man thirty three years old who had had diarrhea and occasional intestinal bleeding for twenty six years was found to have a large inoperable carcinoma beginning 2 cm above the dentate margin In some cases close interrogation disclosed evidence of some increase in the severity of diarrhea or bleeding an increase which probably was related to the development of malignancy Symptoms had been present for one year or less in twenty five cases while at the other extreme six patients said that they had suffered from their presenting symptoms for twenty years or more One man forty four years old said that he always had had loose bloody stools His only other symptom was vague pain which had occurred recently in the lower part of the abdomen In addition to multiple polyposis examination revealed an annular carcinoma in the midportion of the rectum In seven cases in which symptoms had been present for less than two years examination revealed a malignant lesion superimposed upon polyposis In one of these cases symptoms had been present for only four months We must conclude that multiple polyposis may exist for years without causing symptoms

adequate treatment If the bleeding is active additional electrocoagulation may control it or packing may be necessary

Familial Multiple Polyposis—Diffuse familial multiple polyposis seems to be a distinct disease entity but sometimes clinically and proctoscopically it is difficult to separate it from what we designate as nonfamilial multiple polyposis Nonfamilial multiple polyposis occurs among older persons in whom there appears to be a tendency toward the development of polyps

Transmission—The familial type of disease seems to be transmitted as a mendelian dominant which affects both sexes The disease usually does not appear until the age of puberty In a study carried out in 1951 by Mayo DeWeerd and me only about half of the patients whose condition was diagnosed as familial multiple polyposis could give a fairly definite familial history Specifically in thirty nine of ninety five cases studied there was a definite history of a grandparent parent or sibling who had the disease An additional eleven patients said that relatives had died of carcinoma of the colon whereas the remaining 45 patients had familial histories that were insignificant or the patients did not have any knowledge of the cause of death of their ancestors

Distribution According to Sex—The distribution according to sex was about equal in our study fifty two males and forty three females The disease is peculiar to youth but not to infancy In a review of the literature we failed to find a single case in which the disease had been present in a newborn infant Available evidence is overwhelmingly in favor of the thesis that the disease is hereditary but not congenital

Incidence According to Age—The ages of our ninety five patients ranged from three to fifty six years (at the time the diagnosis was made at the Mayo Clinic) Seventy three (76 8 per cent) of the patients were between twenty and thirty nine years of age All the ninety five patients were white a factor of doubtful significance

Symptoms—No single symptom or symptom complex can be considered pathognomonic of familial multiple polyposis Any of the symptoms present in our series of cases could be attributed to a number of other pathologic lesions of the colon As anticipated blood in the stools and loose stools or diarrhea usually

can be cleared of polyps by fulguration without alteration of the function of the bowel whereas in the presence of the second type fulguration is not recommended because the necessary destruction of hyperplastic mucous membrane results in a scarred contracted ill functioning channel

Roentgenologic Examination —Of equal importance as a special diagnostic aid is roentgenologic examination of the colon Generally simple fluoroscopic examination demonstrates these polypoid lesions very satisfactorily but a very dramatic demonstration can be obtained by means of the double contrast method first described by Fischer and modified by Weber These diagnostic procedures were used in eighty nine of the ninety five cases in our series The roentgenologic diagnosis was as follows multiple polypoid lesions of the entire colon in seventy five cases multiple polyposis plus carcinoma in twelve cases and carcinoma alone in two cases In these two cases laparotomy disclosed polyposis of the entire colon

In six of the ninety five cases roentgenologic examination of the colon was not performed because of the poor physical condition of the patients or because of various other contraindications such as the presence of an obstructing or partially obstructing lesion situated in the lower part of the colon In one of the six cases abdominoperineal resection of the rectum and sigmoid was performed for an obstructing malignant lesion Subsequent roentgenologic examination performed with the aid of a contrast medium injected through the colonic stoma disclosed polypoid disease of the remaining portion of the colon The diagnosis was confirmed by exploratory laparotomy in four cases and by necropsy in the remaining case

Roentgenologic examination of the stomach was carried out in nine cases In seven of the nine cases this examination did not disclose any abnormality One patient a woman twenty seven years old was found to have two *polyps in the stomach* as well as several small *polyps in the small intestine* Polyps also were discovered in the stomach of a man thirty nine years old who had a high grade *carcinoma* of the rectum in addition to diffuse polyposis

Repeated roentgenologic examination of the colon is of value

or that the symptoms from the onset may be such that malignant degeneration produces no noticeable change until it is far advanced

Physical Findings —Complete general physical examination was performed in all the ninety five cases Other than the rectal findings the results of such examination were normal except when some malignant process had entered the picture Then the usual loss of weight anemia abdominal mass and other signs of chronic illness frequently were noted The blood pressure pulse and temperature were not significantly abnormal in any case

Careful digital examination of the rectum undoubtedly was the most important part of the general examination Initial rectal examination was reported unsatisfactory in eight cases However in fifty two of the remaining eighty seven cases a diagnosis of multiple polyposis of the rectum or polyposis plus carcinoma was suggested by this all important maneuver In eleven additional cases *rectal or anal masses interpreted as carcinomas* were observed

Proctoscopic Findings —Proctoscopic examination was performed in ninety three of the ninety five cases and resulted in a positive diagnosis of diffuse polyposis in 100 per cent of the cases in which the rectum rectosigmoid and the sigmoid could be visualized In two cases massive low lying carcinoma made it impossible to inspect that part of the intestine proximal to the lesion

The very evident importance of careful proctoscopic scrutiny in these cases need not be debated Proctologists recognize two main types of the disease In the first type sessile or pedunculated polyps are discrete with normal appearing mucosa intervening (Plate 28) When there are multiple discrete polyps *fulguration* is feasible In the second type considered to be an advancement *of the process beyond type 1 there is diffuse hyperplastic involvement* of the mucous membrane with associated polyps (Plate 29) *The involvement* will appear as diffuse or confluent polyposis Fulguration is not feasible The proctologist s recognition of these two types is as will be mentioned later of utmost importance in the selection of treatment since in the presence of type *1* the portion of the bowel which can be visualized through the anus

Pigmentation—Pigmentation usually is seen in the form of dark brown spots on the outside of the lips (Plate 30) in the region of the external nares and around the eyes and the nails of the fingers and toes The pigmented spots also may occur inside the mouth

Associated Polyposis—Associated polyposis occurs in the stomach and in the small and large intestines Although the polyps are supposed to occur more frequently in the stomach and jejunum seven of the ten patients reported upon by Jeghers and co workers in 1947 were known to have polyps in the rectum or sigmoid As far as I could determine by reading his reports the other three patients did not undergo proctoscopy

Proctoscopic Findings—Staley and Schwarz pointed out after collective review of the world literature and study of all reported cases up to the time of their publication in July of 1957 that a striking aspect of endoscopy of the lower bowel is the infrequency with which it has been used Twelve of the fifty two patients forming the basis of their review were found to have polyps of the large intestine that were within reach of the sigmoidoscope In an additional eleven patients proctoscopy was performed with negative results In the remaining twenty nine cases (56 per cent) there was no report that such an examination had been carried out Therefore it is likely that the real incidence of involvement of the lower bowel by polyps would have been considerably higher if all the patients had undergone proctoscopy

There is nothing in the gross appearance through the proctoscope which will distinguish the polyps occurring in the Peutz Jeghers syndrome (Plate 31) from other adenomas Those I have seen tend to resemble the villous adenomas meaning that they are soft secrete much mucus and are larger than the polyps seen in familial multiple polyposis Neither is there anything in the age of the patients concerned or the incidence according to sex that would set such polyps apart In a report by Bartholomew and associates of seventy five cases there were thirty seven males and thirty eight females The age of the patients at the time of diagnosis varied from two to seventy seven years with an average age of 22 5 years

Symptoms—The initial complaint of most patients who have this syndrome is recurrent attacks of varying degrees of intestinal

when it is necessary to advise a patient to defer a radical operation or when the patient refuses such treatment for personal reasons By careful examination performed every six to twelve months the roentgenologist can with considerable accuracy plot the growth curve of individual polyps and thereby immeasurably aid the diagnostician and surgeon in formulating their advice to the patient Such a program however has many pitfalls and is dangerous particularly if the patient fails to return periodically for examination This was well demonstrated by the plight of two patients who returned for re examination eight and nine years respectively after the initial examination Both had large malignant lesions of the colon superimposed upon the original polypoid lesions

Treatment—Since the treatment of multiple polyposis is surgical we do not propose to discuss it here except for a few general statements There are two schools of thought in regard to the optimal therapy for multiple polyposis One school favoring the complete extirpation of all polyp forming mucosa has preferred the creation of a permanent ileac stoma and the performance of colectomy and proctectomy in every case of multiple polyposis The other school has favored wherever feasible preservation of the terminal segment of large bowel Such preservation has been advocated only in the absence of carcinoma in the segment to be preserved The decision to preserve the terminal segment of the bowel and to avoid ileostomy has been predicated on the assumption that carcinoma can be prevented in this segment of the bowel by the eradication of all polyps initially present and by the periodic removal of all new polyps as they appear Successful postoperative care depends on the patient s co-operation in returning for periodic proctoscopic examination

Peutz Jeghers Syndrome Definition—This is considered to be a rather rare hereditary disease in which there is generalized intestinal polyposis associated with melanin spots on certain areas of the body Most writers on this condition speculate that even though the condition is thought to be rare many instances of it go unrecognized The syndrome was first described by Peutz of Holland in 1921 It remained obscure and unrecognized until Jeghers in this country revived it in 1944 with his classic description and a report of ten cases

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Symptoms—The initial complaint of most patients with this syndrome is recurrent attacks of varying degr[illegible] of [illegible]

obstruction with its associated colicky pains The symptoms of obstruction are caused by intussusception Most patients will experience episodes of rather severe rectal bleeding Consequently many patients have an associated type of hypochromic anemia

Pathogenesis of the Intestinal Polyps—The peculiar histologic characteristics of the polyps in which multiple cell types are arranged much as in normal mucosa suggested to Bartholomew and co workers that the intestinal polyposis in this syndrome actually is a developmental abnormality such as a hamartoma rather than that the process is truly neoplastic This would seem to me to be a very plausible theory because unlike the very high incidence of malignant degeneration which can occur in the familial type of multiple polyposis there has been no report in the literature of a patient with the Peutz Jeghers syndrome who died of cancer nor have any cases been reported in which there was regional or distant metastasis The condition of some of the patients in the reported cases has been followed for more than thirty years during which symptoms persisted but cancer did not develop

Villous Adenoma Definition—Almost all pathologists and proctologists are in agreement that on a morphologic pathologic and clinical basis a benign tumor known as a villous adenoma does occur in the large intestine and that it is distinct from the adenomatous polyp which has been discussed previously

Both of these lesions arise from the mucous membrane but the adenomatous polyp is a typically compact spherical or pedunculated mass while the villous adenoma is a typically soft sessile nonpedunculated mucus secreting tumor

Frequency of Occurrence—The villous adenoma is *relatively uncommon* compared to the adenomatous polyp It tends to develop slowly and frequently covers a large surface of the bowel

Proctoscopic Appearance—The sessile lesion is soft to palpation and feels soft in a manner of speaking in contact with the end of the proctoscope It looks paler than an *adenomatous polyp* or an adenocarcinoma Generally much mucus is present (Plates 27 and 31) Bleeding is minimal when *trauma is inflicted* When a specimen of the lesion is being removed for biopsy a good sized piece of tissue will pull away *with the biopsy forceps*

Microscopic Features —The microscopic features which distinguish villous adenomas are four First there are elongated finger like projections (Fig 36) covered with epithelium and having a core of connective tissue stroma small blood vessels and occasionally small nerve fibers Second typical goblet cells of mucosa are seen but there is a relative absence of glandular elements Third is the predominantly benign structure with frequent areas of carcinoma in situ Finally there is limitation of the superficial mucosal layer without evidence of cellular invasion of the lamina propria



Fig 36 A villous adenoma Section through the wall of the bowel containing a small villous adenoma Notice the frondlike projections from the tumor (x1)

Symptoms —Probably the outstanding symptom of villous adenomas is the passage of great quantities of mucus Some of the patients thus afflicted will say that they have been treated for mucous colitis In a series of twenty eight cases reported by Bacon bleeding occurred in 78 5 per cent diarrhea in 46 4 per cent discharge of mucus in 31 4 per cent protrusion of tumor in 21 4 per cent constipation in 17 8 per cent and loss of weight in 14 3 per cent Rectal pain was present in 3 6 per cent of cases but in 17 8 per cent of the cases there were no symptoms Average age of the patients was 55 4 years and the average duration of symptoms was fifteen months Villous adenomas may occur any place in the colon but in most instances they are found in the rectum

Treatment —Since villous adenomas seem to have a great tendency toward local recurrence most writers on the subject feel that radical surgery is the treatment of choice It is my opinion

that in certain selected cases (meaning those in which the lesions are possibly 2 5 or 3 cm in diameter) fulguration if thoroughly done so that it is carried well around the periphery of the lesion and deep enough will eradicate the lesion This form of treat ment has been used by my colleagues and me over the years and for the most part it has been successful

Inflammatory Polyps or Polypoid Disease—Lesions so desig nated are not true polyps at least early in their formation They arise from small islands of mucosa or granulation tissue which become elevated and edematous as the adjacent surrounding ulcerations heal Microscopically they are composed of inflamma tory mucous membrane fibrous connective tissue and granula tion tissue

Proctoscopic Examination—At proctoscopic examination in flammatory adenomas as a rule can be distinguished from a true adenomatous polyp by the presence of associated active or in active colitis

It is my opinion that at some stage in their existence at least some of these inflammatory polyps will take on malignant or *potentially malignant qualities*

The fact that the incidence of cancer of the colon is about thirty times greater among patients who have or have had chronic *ulcerative colitis than it is among members of the general popula* tion of the same age group lends support to the above statement Additional research on the inflammatory adenomatous-carcinom atous theory of the development of cancer could have in teresting possibilities

Treatment—*It has been our policy at the Mayo Clinic to regard* inflammatory polyps with suspicion When the status of the patient s colitis will permit it fulguration of the polyps is carried out Those polyps which are known to be situated beyond the reach of the proctoscope are watched periodically by means of roentgenograms for evidence of growth If progression is noted radical surgical treatment is indicated

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Chapter XI

CARCINOMA OF THE TERMINAL COLON

This discussion will be confined principally to the symptoms, diagnosis and proctoscopic findings in adenocarcinoma, a lesion which comprises 95 per cent of the malignancies of the terminal part of the colon. Less frequently found malignant processes such as sarcoma and lesions arising from the skin of the anal canal have been discussed elsewhere in this work.

GENERAL REMARKS

First of all, I should like to make a few *general remarks* concerning carcinoma of the large intestine.

1. The fact that carcinoma of the large intestine is, as a rule, slow of growth and is of only moderate malignancy should be of challenging interest to any physician who has to do with the diagnosis or treatment of disease of the large bowel. Extension beyond the wall of the bowel and vascular seeding of carcinoma in this anatomic area do not occur early. For these reasons, more so than in the case of carcinoma in most other locations in the body, much can be done to ameliorate or possibly eradicate carcinoma of the large bowel if diagnosis is made reasonably early.

2. Carcinoma of the rectum is the second most common carcinoma of the gastrointestinal tract in frequency of occurrence, being exceeded in this respect only by carcinoma of the stomach.

3. More so than in the case of malignant processes situated elsewhere, heredity seems to play a role in carcinoma of the colon.

4. A formidable relationship between carcinoma and polyps already has been established in the preceding chapter.

LOCATION OF CARCINOMAS OF THE LARGE INTESTINE

In 1947 Neibling, Waugh and I studied all the carcinomas of the large intestine that had been seen at the Mayo Clinic in

a 4 year period from (January 1 1941 to January 1 1945) There were 817 patients in the group with a total of 825 lesions eight patients having multiple lesions There were 492 males and 325 females a ratio of three to two which is the usual figure given The lesions were located in various segments of the colon as shown in Figure 37

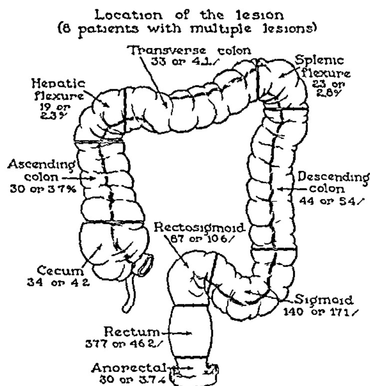


Fig 37 The large intestine showing locations of carcinomas in various segments of this structure based on data studied in 1947 (Reproduced with permission of the publishers from Jackman R J Neibling H A and Waugh J M Carcinoma of the Large Intestine Diagnostic Errors in Relation to Location of the Lesion *J A M A* *134* 1287 1289 [Aug 16] 1947)

SYMPTOMS

Early carcinoma located any place in the large intestine is asymptomatic If symptoms referable to the large intestine are present there is no single symptom or group of symptoms to suggest carcinoma Most of the symptoms usually listed for carcinoma of the colon are late symptoms

Bleeding —Bleeding probably is the most common symptom to indicate the possibility of carcinoma of the large intestine About 95 per cent of patients with carcinoma will give a history of passing blood Bleeding is the symptom that alarms the patient sufficiently to bring him to his physician *Blood mixed with mucus is more suggestive than any other type of bleeding* Moderately severe bleeding (meaning that which might be described as a hemorrhage by the patient or his relatives) *is more suggestive of something other than a carcinoma or a polyp* (see Chapter XVII) *Most of the severe hemorrhages from the bowel which I have seen (aside from postoperative bleeding) were caused by erosion of a peptic ulcer into a large blood vessel* Although the usual textbook description of blood coming from a site as high in the intestine as that of a duodenal ulcer describes the blood as being dark or black I have seen the lower bowel filled with red blood or slightly darkened blood that eventually was traced to a duodenal ulcer Severe bleeding also can occur from ulceration of a Meckel s diverticulum from diverticulitis or from ulcerations and erosions of chronic ulcerative colitis—but rarely from carcinoma or polyps The nature of the bleeding is certainly suggestive but not trustworthy For instance blood noticed on the toilet tissue or blood that drips into the toilet after defecation is suggestive of a bleeding anal lesion such as internal hemorrhoids but it is not conclusive Too frequently I have found some other more significant pathologic process on proctoscopic examination when the history was very suggestive of hemorrhoidal bleeding

Change in Bowel Habit —Symptoms such as *change in bowel habits pain and symptoms of obstruction all are relatively late manifestations of carcinoma of the large bowel*

DIAGNOSIS

In the previously mentioned study of 825 carcinomas of the large intestine by Neibling Waugh and me[2] we divided the lesions into four groups according to the method of diagnosis employed Of course the diagnostic procedures may overlap That is the use of one diagnostic procedure frequently calls for the use of another as a supplementary or confirmatory aid

For instance a rectal carcinoma although palpable should be examined with the proctoscope to gain additional information such as the degree of obstruction the situation of the lesion and whether or not polyps are associated and to permit removal of a specimen of tissue for biopsy Similarly if a polyp or bloody mucus is visualized with the proctoscope roentgenologic study of the colon usually is indicated

Factors Influencing Whether or Not Lesion Is Palpable— Whether or not a carcinoma of the lower part of the bowel is palpable on digital examination is dependent on several factors (1) *the situation of the lesion* (2) *the position of the patient at the time of examination* (3) *the degree of obesity and muscular development of the patient* (4) *the ability of the patient to co operate,* (5) *the thoroughness of the examiner, and* (6) *the mobility of the lesion*

Of the entire group of 817 patients in the study referred to 634 or 77 6 per cent had carcinomas which were located in the terminal portion of the bowel meaning the sigmoid rectum and anorectal region The lesions of 444 patients (70 per cent of the 634 who had lesions of the terminal part of the bowel or 54 3 per cent of all those who had carcinomas of the large intestine) were palpable on digital examination or were within reach of the examining finger Some of the lesions of the sigmoid were palpable in the form of an extrarectal mass and actually were suspected rather than being directly palpable Nine of the 444 patients who had lesions within reach of the examining finger had to be examined under the influence of caudal sacral anes thesia because of their inability to cooperate or because the lesion had extended to involve the sensitive anal area

Of the 444 patients who had palpable lesions 102 or 23 per cent had received treatment during the course of their symptoms other than therapeutic measures directed toward the unsuspected carcinoma that later was found to be within reach of the exam ining finger Analysis of some of the various therapeutic pro cedures instituted in this group of 102 patients showed that forty two underwent surgical treatment for hemorrhoids and that four of these patients underwent this procedure twice Another group of thirty five patients received a form of injection treat

ment for hemorrhoids Four patients underwent surgical treatment of fissure four underwent fistulectomy four others underwent some form of anorectal surgical procedure the exact nature of which the patient did not know Three patients were treated for colitis and three for amebiasis Another four patients received electrical treatment for hemorrhoids three others were treated with suppositories Interesting is the fact that as previously *mentioned* each of four patients underwent two operations for hemorrhoids at a time when they not only had symptoms of carcinoma but also when the carcinoma probably was palpable at either operation had digital examination been done

Lesions Not Accessible to the Examining Finger but Visible at Proctoscopy —As said previously proctoscopic examination is not a substitute for digital examination just as digital examination is not a substitute for proctoscopy Information of a somewhat different nature is obtained by each method In proctoscopic examination the surgeon is interested in determining several things such as first the situation and extent of the lesion in relation to the number of centimeters of normal bowel distal to it so that he may obtain necessary information as to the type of operative procedure advisable Next he wishes to ascertain the degree of obstruction present since this knowledge is important from the point of view of preparation of the patient Third he wishes to secure a specimen of tissue for biopsy so that the grade of the lesion can be determined Fourth he seeks to learn the degree of mobility or fixation of the lesion since this is important from the point of view of operability This factor however finally must be determined at the time of surgical exploration

In addition to the 444 patients (51 3 per cent of all those who had carcinomas of the large intestine) who had lesions palpable on digital examination all of which were visualized at proctoscopic examination 132 additional patients or 16 2 per cent had lesions of the lower bowel which were also visible proctoscopically Thus a total of 576 patients (70 5 per cent of the total series of 817) had carcinomas of the large intestine which were within reach of the sigmoidoscope

In this group of 132 patients with lesions which were not

palpable on digital examination but which were within reach of the proctoscope 34 or 25 8 per cent had received treatment directed at some disease process other than the carcinoma which had remained undiscovered An analysis of this group of thirty four patients showed that twenty eight patients had been treated either surgically or by some unknown procedure involving the anus One had undergone fistulectomy three had been treated for amebiasis and two had been treated for ulcerative colitis Parenthetically it might well be pointed out that amebiasis like chronic ulcerative colitis can coexist with carcinoma of the large intestine

Lesions Discernible on Roentgen ray Studies of the Colon — Of the patients who had lesions located higher in the colon beyond the reach of the examining finger and the sigmoidoscope 232 (28 4 per cent of the total series of 817) had carcinomas which were diagnosed by roentgenograms of the colon Twenty two patients or 9 5 per cent of this group had received other treatment during the period in which they were experiencing symptoms due to the carcinoma Six had been operated upon for hemorrhoids Five had been treated for pernicious anemia by the intramuscular injection of liver extract It is generally accepted that a secondary type of anemia is of common occurrence in the presence of malignant processes of the right portion of the colon Five patients had been treated for colitis of some form two had been treated for amebiasis and two had undergone appendectomy In the last two cases the carcinoma had remained undiscovered even though it was located in the cecal region Polyps in the rectum had been diagnosed and treated in three patients but carcinomas situated in a higher segment of the colon had not been discovered It should be pointed out that the discovery of one polyp or more in the lower bowel ought to be an indication for examination of the rest of the colon by roentgen rays with which the double-contrast method may be employed to advantage

Lesions Encountered at Surgical Abdominal Exploration — The remaining nine (1 1 per cent of the total series of 817) of the 817 patients had lesions that had been diagnosed only at surgical abdominal exploration In most instances in this group perform ance of emergency colostomy had been necessary because of ob

struction of the large bowel and the diagnosis had been made at the time of that operation. No significant treatment had been carried out for members of this group during the period in which they had experienced symptoms from carcinoma.

COMMENT

Paradoxic as it may seem, results of this study indicate that those patients who have carcinomas of the large intestine which can be diagnosed with the greatest ease—that is, by digital examination only—are more likely to be treated for some condition unrelated to the carcinoma. Of the 444 patients, or 54.3 per cent of the total 817, who had lesions palpable on digital examination of the rectum, 102 (23 per cent of the 444), or one of every *four, had received some other treatment not directed at the carcinoma* during the period in which they were experiencing symptoms from the unsuspected carcinoma. *In comparison to this,* of the 232 patients who had lesions located at a higher level in the large intestine 23, or 9.9 per cent of the 232, had been treated for some other disease, while none of the thirteen patients who had carcinomas diagnosed at surgical abdominal exploration had received treatment for the lesion in question.

In the group studied, more than half (54.3 per cent) of all *patients with carcinoma in any part of the large intestine had* lesions which could be palpated by digital examination of the rectum. About a *fourth (23 per cent) of the patients in this* group had received some form of treatment for disease of the colon or rectum but not for carcinoma *during the course of their* symptoms arising from the unsuspected carcinoma that was within reach of the examining finger.

An additional 16.2 per cent of all the patients who had carcinomas anywhere in the large intestine had lesions which were within reach of the sigmoidoscope. A fourth (25.8 per cent) of this group had received treatment for some disease other than the carcinoma, which had remained undiscovered.

Patients who had carcinomas of the large intestine that were *beyond the reach of* the examining finger and sigmoidoscope constituted the remaining 29.5 per cent of the total series of 817. Of this group, 28.1 *per cent had carcinomas that were diagnosed*

by roentgenologic studies of the colon and 1 1 per cent had lesions that were discovered at abdominal surgical exploration In this group during the period of symptoms from carcinoma only 9 9 per cent of the patients had received treatment directed toward any other condition

PROCTOSCOPIC PICTURE IN CARCINOMA OF THE LOWER BOWEL

Even the novice proctoscopist will not have any difficulty in diagnosing the vast majority of carcinomas of the lower bowel The picture will vary considerably Sometimes the edge of the lesion is raised above the adjacent normal mucosa It seems to have a hollowed-out or scooped-out center (Plate 32) (Fig 28) or it may appear as a frank annular carcinoma as shown in (Plate 33) No other lesions except the relatively rare granulomas give a picture that would be comparable The abrupt change from the normal mucosa to the raised proliferative tissue is conspicuous (Plate 31)

Proctoscopic Examination Proximal to the Carcinoma —Since the occurrence of multiple carcinomas or the association of carcinoma and polyps is not uncommon it is a good policy to pass the proctoscope the full distance if this can be done Sometimes the degree of obstruction presented by an annular carcinoma or fixation and infiltration of the lesion will preclude complete passage of the instrument At times we have been rewarded by the finding of another carcinoma or a polyp proximal to the lesion for which we conducted the examination A proctoscope of a smaller caliber than usual might be the answer to traversing the bowel to a point above the carcinoma in certain instances In about 20 per cent of instances of carcinomas of the large intestine one or more polyps will be associated Such a condition as pointed out previously we speak of as sentinel polyp or polyps (Plate 56)

Use of Barium Enema and Roentgen-ray Examination of the Colon —As mentioned in Chapter 3 on the technic of proctoscopy the decision as to whether or not roentgenograms of the colon are to be made should be contingent on proctoscopic findings The reasons for this have been pointed out In general

if a carcinoma is annular it usually is unwise to carry out roentgen ray studies of the colon because the quantity of barium which remains above the lesion may be difficult to remove If a polyp or some other nonobstructing lesion is found at proctoscopic examination roentgen ray studies of the colon usually should be carried out

Removal of Specimen for Biopsy —Much can be learned about the nature of a given lesion by removal of a specimen of it for biopsy For instance, a very friable neoplasm in the rectal area indicates as a rule a low grade of malignancy whereas lesions of the higher grades do not bite away or pull away as easily Yet these features are by no means constant Then too the mobility of a lesion in the lower bowel beyond the reach of the finger might be difficult to determine The biopsy forceps can be of assistance in this by the examiner s grasping the lesion with the forceps and attempting to move it up and down observing whether or not the wall of the bowel seems to move with the lesion It has been our practice to remove two specimens of tissue for biopsy one from the edge of the lesion and one from the center Sometimes the results of examination of these two specimens of tissue disagree

Bleeding of any consequence has not been a problem in our experience after removal of tissue for biopsy

Presence of Blood in the Sigmoid —If blood seems to be coming from above the point which can be reached with the proctoscope regularly used the use of a longer instrument or the making of a roentgenogram of the colon or both is indicated Many times blood in the sigmoid actually comes from below what seems to be the anatomic level and is caused by trauma inflicted by an enema tip or proctoscope and is carried above with the proctoscope

Recording the Description of the Carcinoma —When the lesion is to be described and the description written several features should be noted such as (1) location of the lesion expressed in centimeters above the dentate margin (2) degree of obstruction (3) degree of mobility (4) brief description of the size of the lesion and (5) possibly recommendations as to the type of treatment indicated

Differential Diagnosis —In my experience the greatest diffi

culty is encountered in the diagnosis of the highly malignant adenocarcinomas. Sometimes the very malignant lesion feels like a smooth firm submucosal mass and the only feature of it that arouses the suspicion of the examiner is that the overlying mucosa bleeds a little more readily than normal mucosa does and looks coarse and pebbly. On a few occasions I have hospitalized such patients with the intention of draining an internal abscess. Later I would find that the patient was afebrile, then as examination proceeded with the aid of relaxation afforded by caudal anesthesia the likelihood of a malignant process became greater.

Extrinsic and intramural masses may mimic carcinoma. This is particularly true when some extrinsic malignant process invades through the wall of the bowel.

Several writers[1] have reported on lesions of the rectum and sigmoid which clinically simulated cancer but which proved to be granulomas and disappeared when aureomycin therapy was instituted.

TREATMENT

In general the treatment of carcinoma of the lower bowel is surgical and therefore is not within the scope of this work.

Perhaps more so than is true of prevention of cancer situated any place else in the body, prevention of cancer in the lower bowel can be approached easily and simply by the diagnostic maneuver of proctoscopy.

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Chapter XII

GRANULOMAS OF THE RECTUM

Lesions of the lower bowel which usually are classified as granulomas are relatively rare. We have chosen to group them with intrinsic lesions of the bowel, realizing that in so doing we are open to criticism because the manifestations of many of them are very bizarre and actually may be intramural, extrinsic, anal or perianal. Granulomas occurring inside the rectum may be confused with proliferative lesions such as adenomas or adenocarcinoma, and the main significance they have is due to this fact.

FOREIGN BODY GRANULOMAS

Nonabsorbable Suture.—The foreign body granuloma is the commonest granulomatous lesion that is seen in the lower bowel. It is seen at or near the site of anastomosis after resection for a malignant process or other condition. The foreign body producing the granuloma generally is some *nonabsorbable suture material*, such as cotton or silk. *As a rule, the lesion is pea size* or smaller, rarely larger.

The significance of this type of granuloma is that unless the proctoscopist is aware of the lesion he may confuse it with recurrent neoplasm or adenomatous polyps.

Distinction may have to be settled by removal of a specimen of tissue for biopsy and microscopic examination of sections.

Grossly, this type of granuloma is more *friable than an adenomatous polyp*. Sometimes the question of differential diagnosis *can be settled when the* biopsy forceps bites into a granuloma of this kind, because such an action will expose the suture material in the center of the granuloma.

Barium Granulomas.—A few cases of barium granulomas of the rectum have been reported in the literature. Barium granulomas may *follow the use of a barium enema for roentgenologic* studies of the colon. The barium enters the rectal wall as the

result of trauma inflicted by a misdirected enema tip or through the internal opening of a fistula

LIPOID GRANULOMAS

Lipoid granulomas probably are the next most common granulomatous lesions seen in the lower bowel. They result from the use of a mineral-oil medium in the injection therapy of internal hemorrhoids. Because they usually appear in the form of a submucosal nodule or lump of variable size we have chosen to discuss these tumors in the chapter concerned with intramural lesions (see Chapter XIII).

AMEBIC GRANULOMAS

Amebic granulomas frequently are referred to in the literature. They must be very rare. I have seen one and in that instance the granuloma occurred in the lower part of the sigmoid. At proctoscopy it was described as a sessile polyp 1.5 cm in diameter. Tissue removed from it for biopsy was reported as inflammatory granulation tissue. The parasite was found in examination of stools. The granuloma disappeared when adequate antiamebic therapy was carried out. Presumably this type of granuloma occurs more frequently in the right side of the colon, which would be suspected since amebic infestation involves principally that portion of the colon.[1]

LYMPHOGRANULOMA VENEREUM

The lesions caused by lymphogranuloma venereum are presented in the chapter on intramural lesions because they spread primarily by way of the lymphatic vessels and because the full thickness of the wall of the bowel is affected by the process.

SYPHILIS

In older medical literature much was written about syphilitic gumma of the rectum. This lesion might have existed when syphilis was much more common than it is now. In my opinion however most of the so-called gummas of the rectum actually were the lesions of lymphogranuloma venereum which coexisted with syphilis. The only syphilitic lesion of the anorectal region which I have seen was a primary chancre of the anus.

OTHER GRANULOMATOUS LESIONS

Lesions such as hidradenitis suppurativa tuberculosis actinomycosis blastomycosis granuloma inguinale and schistosomiasis will be discussed elsewhere in this book in the sections devoted to lesions of the perianal skin and mucosal ulcerations (see Chapters VI and XXVIII)

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Chapter XIII

INTRAMURAL TUMORS OF THE LOWER BOWEL

In decision as to a classification of lesions which occur in the wall of the bowel an important consideration is the various kinds of tissue from which benign or malignant lesions may occur in the different layers of the wall of the bowel Other factors are the mode of spread of inflammatory processes such as internal fistula which is producing an intramural lump or chemical tumors resulting from the injection therapy of hemorrhoids causing variable sized masses in this location

From a clinical standpoint however it would seem reasonable to discuss these tumors under the following main headings (1) *malignant* (2) *chemical* (3) *benign* and (4) *inflammatory*

MALIGNANT INTRAMURAL TUMORS

I have encountered three types of malignant tumors that originate in the wall of the lower bowel They are (1) *carcinoid* (2) *leiomyosarcoma* and (3) *lymphosarcoma*

Carcinoids —Carcinoids in themselves are an interesting group of tumors because they may present themselves histopathologically with varying ill defined characteristics Clinically they have displayed characteristics sufficiently confusing to cause some investigators to regard them as benign Others consider them malignant

Proctoscopic Appearance —I have included carcinoids in the present chapter on intramural tumors of the lower bowel because they usually are observed *through the proctoscope* as being submucosal nodules varying from a few millimeters to 2 or 3 cm in diameter although the vast majority range between 5 and 10 mm in diameter Generally they are movable and feel harder to the touch than does the average polyp (adenoma) of the same size A carcinoid has more of the consistency of a hypertrophied anal

papilla but of course it is easily distinguished from an anal papilla by its location Occasionally carcinoids can become pedunculated but still be submucosal The larger ones can ulcerate either by extension and progressive growth or by erosion In this event they may be difficult to distinguish from an adenocarcinoma Grossly the submucosal nodule because of its lipoid or cephalin content most often will produce a yellowish color through the mucosa (Plate 36)

Microscopic Appearances —Another reason for consideration of this tumor as an intramural lesion is the general acceptance of the view that it arises from the Kulchitsky cells in the crypts of Lieberkuhn near the basement membrane of the mucosa of the gastrointestinal tract thus it is that grossly and often microscopically the lesion has the appearance of being submucosal

Microscopically the cells of the carcinoid are small and elliptic with a round or oval nucleus and an eosinophilic cytoplasm The cells may also be columnar palisade or polygonal and tend to form nests rosettes and pseudoglands (Fig 38)

Pathogenesis —*There are much confusion and many diverging* views concerning the *pathogenesis* of this tumor but at the time of this writing opinion *is virtually unanimous that the lesion* is malignant although slow growing slow to metastasize and *for the most part low grade The carcinoid is likened to the* bronchial adenoma as far as degree of malignancy is concerned and it is probably even *slower to kill than is the bronchial* adenoma

Secreting or Functioning Carcinoid —*During* the past two years considerable attention in medical literature has been focused on what is spoken of as *the secreting or functioning carcinoid* tumor The assumption is that this tumor may produce a hormone in a manner similar to that of the adrenal *pheochromocytoma* or of the islet-cell tumors of the pancreas This hormone has been designated serotonin and under *certain conditions* it may produce fatal systemic disease A secreting or functioning carcinoid may be suspected when certain *gastrointestinal* symptoms such as intermittent obstruction and diarrhea accompany the cutaneous vascular manifestations of *periodic flushing* and telangiectasis The symptoms of pulmonary or tricuspid stenosis also may be present

The concept of the secreting carcinoid can be briefly stated First it is held that chromaffin cells of the intestinal tract collectively form an endocrine gland that elaborates serotonin or 5 hydroxytryptamine which is derived from the essential amino acid tryptophan Second it is believed that the hormone serotonin is normally liberated into the blood stream and has definite physiologic activities such as direct stimulation of nerve plexuses in the bowel Third it is judged that carcinoid tumors are composed of these chromaffin or secretory cells and that they may produce excessive amounts of the hormone serotonin which creates certain intestinal cardiovascular cutaneous and metabolic symptoms as described above

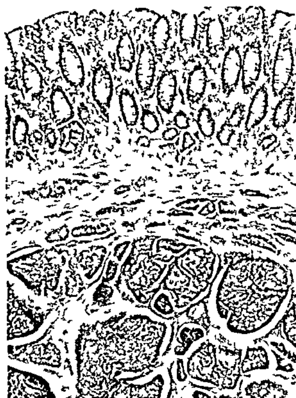


Fig 38 *Carcinoid* The mucosa overlying the bundles of carcinoid cells is normal (hematoxylin and eosin x50) (See Plate 36)

It is a fascinating physiologic thesis only the salient features of which have been stated here For additional detailed informa

tion the reader is referred to the excellent original work by Thorson and associates or to a summary of the reports of cases and literature up to June of 1956 by Mattingly

It is very doubtful that the small carcinoids occurring in the lower bowel such as shown in Plate 56 produce serotonin in sufficient quantity to cause symptoms

Location of Carcinoids—In 1954 I studied the records of 112 patients who had a carcinoid tumor located somewhere in the body These patients were seen at the Mayo Clinic in a seven year period *In forty four cases (39 3 per cent) the tumor occurred in the rectum* whereas in seventeen cases (15 2 per cent) it occurred in the bronchus The ileum the lungs and the ileocecal region were the next most common sites In this same study I noted that prior to 1947 fewer than a dozen cases of carcinoid *of the rectum had been indexed in the files of the Mayo Clinic It had generally been considered that the appendix and ileocecal region are the most common sites of occurrence of carcinoids, but this is definitely not true the incidence of these lesions being far greater in the rectum and bronchus* Perhaps the high incidence of carcinoids in the rectum (39 3 per cent of all carcinoids) is the result of (1) an increasing awareness and high index of suspicion with which rectal submucosal nodules in general are now regarded (2) the relative ease with which the rectum can be examined as compared to other possible sites of occurrence and (3) *the fact that a proctoscopic examination is now included* much more frequently as part of the annual physical examination than it used to be

Many authors *feel that rectal carcinoids* occur much more frequently on the anterior rectal wall in the distal 10-cm portion *of rectum This may be true* and it was true in my forty four cases but at the same time I cannot find any scientific explanation for such preponderance *Furthermore it must be remembered* that the anterior rectal wall is much more available to careful objective examination with the patient in the inverted position than is the posterior rectal wall

Sex Distribution—The distribution of patients according to sex *in my forty four* cases of rectal carcinoids was about equal twenty three patients were men and twenty-one were women

Incidence According to Age.—The vast majority of lesions occur among persons more than forty years old.

Treatment.—In my opinion, local excision or biopsy and fulguration is the treatment of choice for rectal carcinoids up to 1 cm. in diameter that are not ulcerated.

It should be kept in mind that almost all rectal carcinoids are asymptomatic and therefore are found only at routine proctoscopic examination.

Leiomyosarcomas.—Although myosarcomas of the rectum are not common, 7 per cent of all those that develop in the entire gastrointestinal tract occur in the rectum. In a study of myomatous tumors of the rectum carried out by Anderson, Dockerty and Buie, 50 per cent of these lesions were found to be malignant. All ten of the malignant myomas were located between the dentate line and six inches proximal to it. Five arose on the posterior wall, four on the lateral wall and one on the anterior wall. Five of these leiomyosarcomas were ulcerated, but the mucosa overlying the other five was intact and normal. I have seen only three leiomyosarcomas of the rectum. All three were submucosal. One was diagnosed by the use of a Silverman needle to obtain tissue for biopsy; the other two were diagnosed by excision of the submucosal mass with the patient under the influence of caudal and sacral block anesthesia.

It is the general consensus that these myosarcomas should be treated by radical surgery, meaning some type of combined abdominoperineal operation. The prognosis in general is not good. Even those patients in Anderson's study who had low-grade myosarcomas lived an average of only 5.2 years after operation.

Lymphosarcoma.—Lymphosarcoma of the lower bowel generally is considered to be part of a systemic disease. Meyer reported on thirty-three patients with lymphosarcoma of the rectum seen at the Mayo Clinic, and he found 130 cases reported in the literature. As far as could be determined in the thirty-three cases reported by Meyer, the rectal lymphosarcoma was secondary to a generalized process in nine cases, to a primary process in twenty, and was indeterminate in four cases. The decision between primary origin and secondary origin was difficult to make because about 65 per cent

of those lesions that had been accepted as primary later underwent dissemination Men outnumber women two to one among those afflicted and the average age was 56 4 years Symptoms were not specific but 72 per cent of patients experienced bleeding whereas pain and constipation occurred in 45 per cent Occasionally evidence of a systemic lymphoid disease will help in the diagnosis In Meyers thirty three cases of lymphosarcoma of the rectum fourteen patients had multiple lesions thirteen had diffuse involvement of the lower bowel and single lesions occurred in twelve

In my experience those patients who have diffuse involvement or multiple lesions also will have considerable mucosal edema The mere facts that the process is diffuse multiple or submucosal and that edema is present will arouse the examiner s suspicions that the process probably is lymphatic in origin A single lymphosarcoma that has ulcerated through the mucosa is grossly indistinguishable from an adenocarcinoma

Only 20 per cent of the lymphosarcomas reported by Meyer had ulcerated or eroded through the lining membrane of the rectum

Tissue for biopsy usually can be obtained with a regular biopsy forceps It may be necessary with the blades of the instrument to bite away the overlying mucosa to obtain specimens of tissue from a site deep enough to be of diagnostic significance

The treatment of choice is radiation therapy

The prognosis is poor Two thirds of the patients reported upon by Meyer were dead within 17 7 months

CHEMICAL INTRAMURAL TUMORS

Oleomas —Oleomas or oil granulomas of the rectum result from the injection treatment of internal hemorrhoids with a sclerosing medium which contains a mineral-oil rather than a vegetable oil base A persistent tumefaction results[6] During the past decade the trend has been away from the injection treatment of internal hemorrhoids consequently we do not see as many of these oil granulomas as formerly Usually the small granulomas are asymptomatic the larger ones may cause a sensation of rectal pressure or fullness or a dull aching sensation

Our principal interest in the tumor is from the standpoint of

differential diagnosis Although oleomas generally occur in the lower part of the rectum in the vicinity of the internal hemorrhoidal zone they may occur as high up as the rectosigmoid (Chapter XV)

Clinically oil granulomas may be difficult to distinguish from malignant processes The most important differentiating feature is that the overlying mucosa generally is intact in the presence of oleomas in contradistinction to the usual ulceration in adenocarcinoma Distinction of oleomas from other intramural or submucosal tumors may be more difficult and although a history of previous injection therapy for hemorrhoids is of help on several occasions I have found oil granulomas coexisting with a carcinoid Sometimes it is found that the injection therapy was administered as long as twenty years previously

As a rule it is not difficult to obtain tissue for biopsy from these oil granulomas by means of an ordinary biopsy forceps first of all it is necessary to remove the overlying normal mucosa with the biopsy forceps Microscopic sections of tissue obtained in this manner will exhibit a chronic inflammatory reaction with fibrosis and foreign body giant cells will be seen surrounding the lipoid substance (Fig 39)

BENIGN INTRAMURAL TUMORS

This group of lesions includes (1) *benign lymphomas* (2) *leiomyomas* (3) *lipomas* (4) *hemangiomas* (5) *pneumatosis cystoides intestinalis* and (6) *other benign intramural tumors*

Benign Lymphomas Synonyms —Benign lymphomas also are called lymphadenomas lymphadenoid polyps lymphoid polyps enlarged lymph follicles and rectal tonsils There is still much confusion as to the nomenclature of lymphoid tumors in general Although the term lymphoma itself is not listed in the *American Lymphatic Registry* most clinicians and pathologists refer to neoplasms of the lymphoid tissues as lymphomas The nonmalignant type is called the simple or benign lymphoma to distinguish it from the malignant group which includes lymphosarcoma lymphocytoma and lymphoblastoma

Distribution According to Sex —Benign lymphomas are distributed about equally according to sex and similarly occur about

equally at all ages As a rule these lesions are asymptomatic and are found incidentally in routine rectal examinations in the form of an intramural nodule or a submucosal sessile or pedunculated polypoid looking lesion varying from a few millimeters to 3 or 4 cm in diameter



Fig 39 *Oil granuloma* Notice the oil droplets in the submucosal tissue Fibrosis is marked (hematoxylin and eosin x75)

Benign lymphomas usually are firmer to palpation than an adenomatous polyp and the large sessile lesions may be difficult to distinguish clinically from a malignant type of lymphoma When the benign type is present however there is no associated generalized lymphoid disease

In seventy cases of benign rectal lymphomas reported by Helwig and Hansen the lesions exhibited no special predilection for any particular site in the rectum Forty of the patients had single lesions and twenty five had multiple lesions In five patients the number of benign rectal lymphomas was unknown

Proctoscopic Appearance —Most of the benign rectal lymphoid tumors which I have seen were submucosal They imparted a *blue gray hue to the overlying mucosa* (Plate 5) and seemed to be situated immediately beneath the mucosa In general they are

firm to the touch and are sessile ulceration or erosion of the overlying mucosa is uncommon

Generally it is possible to obtain a satisfactory specimen for microscopic study by means of an ordinary biopsy forceps manipulated in such a manner as to bite away the overlying mucosa If the lymphoid polyp is large and sessile so that it appears that the specimen may be inadequate it is probably best to hospitalize the patient and remove the entire tumor with the aid of caudal and sacral block anesthesia

Microscopic Appearance —Microscopically lymphoid polyps are composed of lobules of lymphoid tissue which exhibit a pattern of follicle formation with reaction centers The follicles as well as the reaction centers often are large and irregular sometimes they appear to be confluent The cells of the reaction centers when properly stained with hematoxylin exhibit paler nuclei and more abundant cytoplasm than do the surrounding mature appearing smaller lymphocytes Each lobule of the lymphoid tissue might be composed of one or several follicles In areas within some of the lymphoid polyps and occasionally within the entire polyp the trabeculae surrounding the lymphoid lobules are poorly formed and the follicles of cortical substance seem to be fused into a continuous mass of lymphatic tissue This is the reason that pathologists prefer to have the entire lesion available for study before they arrive at a diagnosis instead of making the decision on the basis of study of a small specimen

Leiomyomas —Leiomyomas of the lower bowel are uncommon

Gross *Appearance* —Most of the leiomyomas I have seen were pea size firm submucosal nodules usually situated in the lower part of the rectum close to the dentate margin Clinically they are indistinguishable from other small submucosal nodules They are thought to be more common among men between the ages of thirty and fifty years Most of the lesions are asymptomatic they are found at the time of routine proctoscopy (Plate 37) Presumably they can become large and ulcerated but I have never seen those forms

With the aid of caudal and sacral block anesthesia to relax the anal musculature these tumors as a rule can be enucleated readily

Leiomyomas originate from the smooth muscle of the wall

of the bowel Microscopically they consist of nonstriated spindle shaped muscle cells surrounded by a network of fibrous tissue (Fig 40)

Possibilities of Malignant Change—Leiomyomas should be removed because it is thought that in the rectum frequently they degenerate into leiomyosarcomas



Fig 40 *Leiomyoma* Notice the closely adherent overlying normal rectal mucosa *Spindle shaped smooth muscle cells and fibrous tissue* compose the tumor This microscopic section was taken from the tumor shown in Plate 37 (hematoxylin and eosin ×50)

Lipomas—Lipomas can be expected to occur just as frequently in the anorectal region as they do in other parts of the body

Gross Appearance—Lipomas of course are variable in size from pea size submucosal or intramural nodules which sometimes are difficult to distinguish from carcinoids because of the yellowish appearance through the mucosa (Plate 38) to large pedunculated masses that prolapse through the anus If they are small lipomas do not give rise to symptoms If they are large they may cause symptoms of partial obstruction and if they are pedunculated they may be factors in causing intussusception In my experience they are much more common in the ischioanal fossa in which

location they are likely to be confused with a chronic abscess

Treatment—Treatment is enucleation if the lesions are giving rise to symptoms or if there is a question about the differential diagnosis

Hemangiomas Importance of Recognition—Although he mangiomas of the lower bowel are not common it is important that they be recognized from two standpoints first they can cause severe hemorrhage and second they can be mistaken for adenomatous polyps My first introduction to a hemangioma of the rectum took place years ago and I think a lesson can be learned from that experience Grossly the lesion looked like a sessile proliferative type of polyp A specimen was removed from it for biopsy This action of course was followed by severe bleeding which could not be controlled by fulguration It was necessary to pack the rectum and later to use a radium pack to control the bleeding

Proctoscopic Appearance—Proctoscopically the hemangioma may resemble the sessile polyp described above but on closer scrutiny it appears to have a localized or diffuse purple or bluish coloring with visible points of bleeding but without definite ulceration (Plate 39) At the other extreme the hemangioma may involve all the mucosa of the lower bowel and through the proctoscope it may appear as large spongy bluish compressible lumps or varicosities

If it seems advisable to remove a specimen of tissue for biopsy the physician should be prepared to cope with severe hemorrhage

Microscopic Appearance—Microscopically there are two types of hemangiomas the *capillary* which is more common than the *cavernous* type

Treatment—In the presence of extensive hemangiomas of the rectum if recurrent severe bleeding is a threat to life radical resection of the involved segment of bowel with colostomy may be necessary If the hemangioma is small and located low enough down it may be removed transanally by *surgical diathermy* or it may be fulgurated Radium applied topically in the form of a pack will help produce scarring and thus obviate severe hemorrhage

Pneumatosis Cystoides Intestinalis—This interesting disease

entity is important from the standpoint of differential diagnosis As the name would indicate it is a condition in which gas cysts occur submucosally or subserosally Therefore it is included in the present chapter on intramural tumors



Fig 41 *Typical pneumatosis cystoides intestinalis* Postevacuation roentgenogram of the colon after the retrograde administration of barium suspension Notice the presence of multiple smooth sharply demarcated usually hemispherical sessile shadows of gaseous density lying next to and indenting the luminal barium contrast shadow of the bowel The process is more obvious in the left side of the colon (see Plates 40 and 41)

Confusion With Multiple Polyposis —If pneumatosis cystoides intestinalis is seen through the proctoscope it is likely to be confused with *multiple polyposis* or *multiple adenomatosis* The condition usually is diagnosed at laparotomy or with the aid of a barium enema (Fig 41) because it occurs most commonly in the ascending colon Next in frequency of occurrence of the disease according to site are the terminal part of the ileum transverse colon descending colon and much less frequently the sigmoid and rectum Pemberton Smith and Holman in a survey

of the world literature on the subject were able to find only seven cases in which the changes of pneumatosis cystoides intestinalis were described at sigmoidoscopic examination In all the other cases the condition was diagnosed roentgenologically or at laparotomy Pneumatosis cystoides intestinalis occurs in children as well as in adult persons

Causation—The causation is unknown but several theories have been advanced (1) mechanical (2) bacterial (3) chemical (4) nutritional and (5) neoplastic[1]

According to the theory of the *mechanical* origin of pneumatosis cystoides intestinalis a total or usually a partial intestinal obstruction exists The cause of the obstruction may vary but with the accompanying increase in peristalsis gas is forced through defects in the mucosa These defects may be gross or microscopic

In three of four cases of pneumatosis cystoides intestinalis reported by Marshak and associates there was involvement of the sigmoid colon These authors raised the question of a possible relationship between the trauma of sigmoidoscopy with and without the taking of specimens for biopsy and the occurrence of the condition in the left side of the colon

Relative to the theory of the *bacterial* origin of pneumatosis cystoides intestinalis some investigators have demonstrated microorganisms in the gas cysts

The theory of the *chemical* origin of pneumatosis cystoides intestinalis is based on the fact that gases can be absorbed by the mucous membrane of the intestine under certain circumstances

The composition of gas in these submucosal gas cysts varies somewhat according to the figures of different workers but in general is said to be 5 per cent carbon dioxide 15 per cent oxygen 80 per cent nitrogen and a trace of hydrogen

The theory of the *nutritional* or *alimentary* origin of pneumatosis cystoides intestinalis is based on observations by veterinarians that in certain animals and particularly swine manifestations of emphysema are seen after the prolonged use of deficiency diets

Proponents of the theory that pneumatosis cystoides intestinalis is of *neoplastic* origin hold that tumor cells are responsible for the formation of gas and specifically that under the influence

of giant cells the lymph is transformed into gas This theory is regarded as being the least likely

Symptoms—The *symptoms* of pneumatosis cystoides intestinalis frequently are those of the associated disease such as peptic ulcer or whatever is causing the *intestinal obstruction* Generally there are a *variable amount of rectal bleeding* associated secondary anemia flatulence and abdominal distress

Proctoscopic Appearance—The *proctoscopic appearance* is characteristic (Plates 40 and 41) The mucosa has a translucent bubbly appearance The gas cysts impart the sensation of firmness making it more difficult to pass the proctoscope in contradistinction to the soft easily compressible adenomas characteristic of multiple adenomatosis with which this condition is most likely to be confused Moreover the mucous membrane over the sites of the gas cysts appears to be normal rather than polypoid The cysts will vary in size from that of an acorn to that of a golf ball The examiner should try to visualize in his mind a mucous membrane which bleeds easily and which covers tightly the objects just described for such is the picture of pneumatosis cystoides intestinalis

In the cases reported by Alford and associates the authors speculated that there was an alteration of the normal physiology of the absorption of gases by the blood stream that the gas remained in the intestinal wall acting as a foreign body as indicated by the reaction of the surrounding tissue which forms giant cells and connective tissue that encapsulates the bubbles of gas

Clinical Importance—The condition is *important from a clinical* standpoint because it is one of the less frequent causes of severe gastrointestinal hemorrhage and it is important also from the standpoint of distinguishing it from multiple polyposis

I have seen four patients with *pneumatosis cystoides intestinalis* within the past year and the condition of all of them was diagnosed by proctoscopic examination and corroborated by roentgen ray studies of the colon *The submucosal gas cysts* did not involve the rectum in any of these cases extending distally only to the rectosigmoid zone The disease of one of these patients was correctly diagnosed by *roentgenograms* of the colon before

the patient came to us The difficulty of the other three was suspected on the basis of the gross appearance of the gas cysts through the proctoscope and our suspicions were confirmed when as the blades of a biopsy forceps bit through the mucosa the cyst deflated

Although involvement of the lower bowel and the proctoscopic diagnosis of this condition both are reported to be rare the fact that we have diagnosed pneumatosis cystoides intestinalis correctly in four cases within the past year would prompt the question of whether involvement of the distal portion of bowel is not more frequent than is generally believed Until about a year ago so far as I know the condition either had been overlooked or at least had not been diagnosed in the Section of Proctology of the Mayo Clinic

Treatment—The treatment of this disease is an individual problem Generally speaking the symptoms are sufficiently benign to justify conservatism Although there is evidence that the condition may regress spontaneously there is also evidence that it may persist for years Varying degrees of intestinal obstruction which seems to be a predominant feature of the disease may require surgical intervention

OTHER BENIGN INTRAMURAL TUMORS

According to most pathologists *other benign intramural tumors* of the rectum such as *fibromas neuromas* and *lymphangiomas* do occur but are extremely uncommon

INTRAMURAL INFLAMMATORY LESIONS

It is difficult to decide exactly what inflammatory processes would be considered intrinsic intramural or extrinsic The decision is somewhat contingent on individual concepts of the causation of the particular inflammatory process under consideration In my opinion it is fitting to discuss *venereal lymphogranuloma* here because it is the intramural fibrous changes of this disease that are primarily responsible for the rectal manifestations characteristic of it Similarly *internal rectal abscesses and fistulas* which usually originate in a crypt at the dentate margin and spread proximally in the wall of the bowel also ought to be considered here

Lymphogranuloma Venereum—I shall readily admit that many have had far greater experience with this disease than I have Several years ago while making hospital rounds with some of my colleagues in large eastern seaport cities I noticed that it was the rule rather than the exception for an entire ward to be devoted to twenty or more patients all of whom were afflicted with lymphogranuloma venereum in various phases Physicians in these localities tell me they are seeing this venereal disease less often than formerly Perhaps the lessened incidence is the result of the advent of the antibiotic drugs or of an improved standard of living which always accompanies improved economic conditions

Frequency of Occurrence—During 1955 in which proctoscopic examinations were carried out for 19 581 patients at the Mayo Clinic fifty three patients with an inflammatory type of rectal stricture were seen In all but eleven of these patients the stricture was caused by chronic ulcerative colitis radiation proctitis internal fistula and the like So far as we could determine in the eleven cases the stricture probably was the result of venereal lymphogranuloma although the reaction of the Frei test was negative in four cases in which the stricture was of long standing

In all the eleven patients who had rectal stricture resulting from venereal lymphogranuloma the disease was in a chronic phase and the main complaint of the patients was referable to a low lying tubular rectal stricture

Pathogenesis—It is not the purpose of this work to reiterate obvious data concerning this disease the pathogenesis of which has been so ably presented by Nesselrod Originally at least lymphogranuloma venereum is a systemic disease caused by a virus venereal in origin Although the disease has many clinical manifestations those involving the anorectal region by way of the lymphatic vessels probably are the most important and consistent

Most commentators on the subject describe an initial early change in the rectal wall itself in which there is a reddened friable mucosa that bleeds easily This change involves principally the lower half of the rectum and is followed by a gradual narrowing of the lumen Proctoscopic examination at this stage of the disease may show that the involved segment of rectum is completely denuded of mucosa with a narrowed ulcerated lumen

that bleeds very easily under slight trauma I have never seen this phase of the disease

Rather the chronic phase of venereal lymphogranuloma which we see at the Mayo Clinic reveals that the tubular stenosis or contraction in the lower part of the rectum is already well established (Plate 12) The ulcerated lumen through the zone of the stricture is replaced by a dense tough ulcerated scar that does not bleed but will frequently contain sinuses out of which pus will ooze

Differential Diagnosis—In the *differential diagnosis* the most important single procedure in establishing the stricture of venereal lymphogranuloma probably is the *intracutaneous Frei* test In 1925 Frei demonstrated that attenuation of the virus by heating pus from an inguinal bubo of a patient with the disease and injecting it into other infected persons creates a sensitivity reaction similar to the tuberculin reaction The material or antigen used for injection today is prepared from the yolk sac of the chick embryo which has been inoculated with the virus of lymphogranuloma venereum

The actual performance of the test consists of the intradermal injection of 0 1 ml of the virus antigen into the flexor surface of the forearm At the same time a control antigen of 0 1 ml prepared from normal yolk sacs is injected in the same manner a few centimeters away from the site of injection of the virus antigen Readings are made after forty eight to seventy two hours The surrounding redness is ignored and the central papule is measured If sensitivity to the normal antigen is absent a papule 6 mm or greater in diameter is significant

The specificity of this test has been challenged by some authors who feel that in many instances the infection with the virus of lymphogranuloma venereum is overshadowed by the presence of one or several other venereal diseases Other evidence however indicates that when the control antigen is used the specificity is high and that the Frei test enables the diagnosis to be made in 90 per cent of cases of the disease It is further asserted that the complement fixing antibodies which are responsible for a positive result of the test are detectable and remain active for many years or even for life after the initial infection

Therefore this relatively simple intracutaneous test should be of diagnostic value when the disease is of long standing

Another procedure the *complement fixation test* is regarded as the most useful laboratory procedure for the diagnosis of the disease according to Manire The antigen and control used are prepared the same as for the Frei test Although the complement fixation test may be more sensitive than the intracutaneous test it is a considerably more complicated laboratory procedure Furthermore the specificity of this test has been challenged by Knott who wrote that falsely positive results of the tests were reported to be especially common among patients with early syphilis It has also been said that the antigens used in the lymphogranuloma venereum complement fixation test do react specifically with other viral diseases such as psittacosis Even though psittacosis is a relatively rare disease it could be a factor in producing a falsely positive result of a test

The rectal stricture caused by venereal lymphogranuloma is sometimes difficult to distinguish from the inflammatory stricture of quiescent chronic ulcerative colitis In this latter disease the stricture tends to be more or less diaphragmatic whereas in the former it is more likely to be tubular or hourglass shaped In the presence of lymphogranuloma venereum the mucosa proximal to the stricture appears normal at proctoscopic examination whereas in chronic ulcerative colitis there will either be an active process in the mucosa or the scarred evidences of the disease

Associated Carcinoma—The complications of carcinoma superimposed upon or coexisting with lymphogranuloma venereum have been reported in the literature White and Miller were able to find 60 cases in which these two conditions occurred together the carcinoma being located in the rectum anus genitalia or mouth In the case reported by White and Miller themselves the lesion was a squamous cell carcinoma of the anus a neoplasm which seems to be the most common type of coexisting malignant complication When the rather common occurrence of these two diseases separately is considered meaning carcinoma of the anus or rectum by itself and lymphogranuloma venereum by itself it is not surprising that isolated reports of their coexistence should be reported In my opinion the presence of lymphogranuloma

venereum does not predispose to the development of carcinoma of the anus or rectum In my own experience the coexistence of the two conditions has not been seen

Treatment—It would seem reasonable that early in the course of the disease the broad spectrum antibiotic agents might be of value in eliminating the inflammatory component and thus obviating or making the rectal stricture less severe It is rather generally agreed that chemotherapy is of little or no value in resolving the scar tissue once it has formed

It is of value to instruct the patient in the use of hot retention enemas or hot rectal irrigations with the temperature of the water at 105° F This measure is a valuable adjunct because it causes the stricture to become a little more flexible improves the blood supply to the area and washes fragments of stool and infected secretions away In the treatment of some patients we have combined this measure with rectal diathermy (see Chapter XXIII)

If the location of the stricture is low in the rectum and a relatively short segment of rectum is involved surgical treatment such as posterior proctotomy followed by daily dilatations and rectal diathermy is of some help Radical procedures such as some combined abdominoperineal operation are indicated when anorectal involvement is extensive

Internal Abscesses and Fistulas—Another cause of an intramural inflammatory lesion is an internal abscess or fistula

Mechanism of Formation—The *mechanism of formation* is the same as that in which an abscess points externally The process usually evolves as follows (1) infection in a crypt (2) extension of the inflammatory process into the wall of the *rectum* with proximal spread (3) necrosis and formation of pus Either the pus drains back through the primary source of the fistula or a secondary opening is created higher up in the wall of the rectum if the abscess should break there In the first *instance there* would be an incomplete internal fistula and in the second instance a complete internal fistula would result

Differential Diagnosis—The *differential diagnosis* of *internal* fistulas generally is not difficult if the mechanism of their formation is understood as described above The finger of the experi

enced examiner can trace out the induration of the fistula or chronic abscess as it extends to its source in an *offending crypt* This submucosal inflammatory process is most likely to be confused with the oil granulomas caused by injection therapy The *history would* be the most significant distinguishing factor Examination with the assistance of caudal and sacral block anesthesia may be necessary to distinguish the fistula or abscess from submucosal or intramural tumor masses I have seen an internal fistula which manifested itself as a rectal stricture entirely *unrelated to lymphogranuloma venereum The inflammatory* process had burrowed completely around the rectal circumference in the wall of the rectum

Treatment —The treatment of all of these inflammatory processes is surgical the basic principle of which is the establishment of adequate drainage

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Chapter XIV

EXTRINSIC LESIONS WHICH INVADE THE LOWER BOWEL

Invasion of the distal portion of the large intestine by (1) endometrial (2) malignant or (3) inflammatory lesions originating outside the wall of the intestine is not uncommon It goes without saying that any of the organs or structures adjacent to the lower part of the intestine may be involved by these processes with subsequent invasion of the wall of the bowel

Although the origin of most of these lesions is known or at least suspected prior to endoscopy some of them may masquerade as originating primarily in the intestine The question of the site of origin is a prime factor in the determination of proper therapy

ENDOMETRIOSIS

In a study carried out in 1941 by Buie and co workers on the various causes of anterior extrarectal masses in women endometriosis was judged to be the most important factor

Symptoms—Women who have endometrial implants in the cul de sac of Douglas or the rectovaginal septum often will consult their physician complaining chiefly of symptoms referable to the rectum or intestines These symptoms vary depending on the extent and degree of involvement of the bowel They are described as aching up in the rectum which is worse at the time of the menstrual period cyclic rectal bleeding varying degrees of constipation aching in the lower part of the back and sometimes symptoms of partial intestinal obstruction Endometriosis invades the wall of the bowel from the serosal coat and grows inward through the muscle layers submucosa and mucosa The process may grow through the mucosa and extend into the lumen of the bowel (Plate 13 Fig 12) Although this infiltration process may affect any of the adjacent pelvic structures the

rectosigmoid is the most common site of invasion The sigmoid rectum or a loop of ileum in the area of the cul-de sac may be invaded

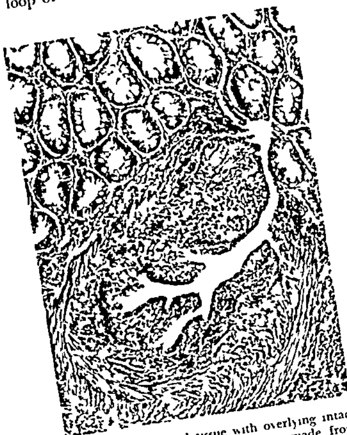


Fig 42 Endometrial tissue with overlying intact rectal mucosa These sections were made from a specimen taken for biopsy from the endometrioma shown in Plate 43 (hematoxylin and eosin x100)

Diagnosis —Here again as in regional ileitis the frequency with which the diagnosis is made by the clinician or proctoscopist is contingent on his threshold of suspicion McGuff and associates reported on 16 patients who had obstruction of the bowel caused by endometriosis seen at the Mayo Clinic and expressed the opinion that since only forty other cases had been reported in the literature up to that time (1948) many instances of the disease must be overlooked The incidence of endometriosis

according to age is important to keep in mind it ranges between the ages of thirty and fifty years About half of those who have the disease have never carried a fetus to full term

Proctoscopic Findings —On digital examination of the rectum the endometrial mass *imparts the sense that it is extrinsic* It is usually nodular firm but not hard tender on pressure and usually is located in the cul de sac less frequently in the recto-vaginal septum Bidigital examination meaning one performed with the index finger of the left hand inserted into the rectum and the index finger of the right hand inserted into the vagina affords good examination of the septum and frequently will disclose small masses in this area which otherwise may be missed

The masses are relatively immobile as compared to a fibroid or ovarian cyst

The proctoscopic picture will vary considerably depending on the extent of invasion of the endometrial tissue Usually it is impossible to pass the proctoscope its entire distance because the mass impinges on the bowel causing that structure to be immobile and decreasing the caliber of the lumen The mucosa of that part of the bowel overlying the mass will vary from normal to a mucosa that bleeds more readily than normal sometimes a puckered mucous membrane with fixed irregular folds is seen and *occasionally a large mass of proliferative* looking tissue is evident which is grossly indistinguishable from carcinoma except that it tends to have a dark bluish tint (Plate 49) Of course the gross appearance of the invading endometrioma will vary somewhat during the menstrual cycle and will depend on the degree of hormonal stimulation from the ovaries I recall one patient with a mass of endometrial tissue inside the lumen of the bowel who underwent proctoscopy at weekly intervals during the cycle About a week preceding menstruation the mass increased several times bled actively during the period and then almost disappeared after menstruation

Even though grossly the mucosa of the bowel overlying a suspected endometrial mass appears to be normal *it is prudent to* remove a specimen of tissue for biopsy Occasionally such a specimen will show *endometrial tissue*

It is well to keep in mind the fact that the most common

extrinsic mass occurring in the cul de sac in women between the ages of thirty and fifty years is an endometrioma

MALIGNANT LESIONS

Extrinsic malignant lesions which invade the lower bowel are not rare The malignant process may originate in the prostate gland seminal vesicles urethra ovaries uterus cervix and vagina

Carcinoma of the Prostate Gland—In view of the facts that carcinoma of the prostate gland is one of the commonest cancers in the male and that the survival rate among patients treated by orchiectomy or diethylstilbestrol is long it is surprising that the lesion does not invade the rectum more often

Normally the prostate gland can be palpated and defined easily by digital examination of the rectum It is the exception rather than the rule for the examiner to be able to define the seminal vesicles by palpation

By far the most common malignant lesion that occurs in the prostate gland is adenocarcinoma digital examination of which reveals in most instances a varying degree of distortion of contour and consistency of the gland In some instances spread of the lesion beyond the confines of the prostate gland is demonstrable It is not rare for patients with carcinoma of the prostate gland which impinges on the rectum to complain primarily of a feeling of fullness a dull aching up in the rectum or a sensation of incomplete defecation while symptoms referable to the urinary tract and bladder may be absent

Review of Literature—Study of the literature indicates that only a few authors 7 have reported involvement of the wall of the rectum by carcinoma of the prostate gland Mention was found of five cases in which the tumor had extended posteriorly to occlude or to decrease the lumen of the rectum Colostomy was necessary in two of the five cases to relieve symptoms of obstruction Other authors such as Barringer have reported cases in which the rectum was unwittingly resected for what was thought to be carcinoma of the rectum but what actually was a prostatic cancer invading the rectum In most such cases the chief symptoms had been related to the rectum rather than to the disturbances of the urinary tract Young in a review of approximately 800

cases of carcinoma of the prostate gland wrote that the rectal mucosa was found to have been invaded and ulcerated in not more *than a dozen instances* It is surprising that the rectum is not involved more frequently when it is considered that various authors estimate that 15 to 20 per cent of men [3] beyond the age of fifty years have carcinoma of the prostate gland A probable explanation of the low incidence of involvement of the rectum is that the interposed rectovesical fascia frequently spoken of as Denonvilliers fascia (Fig 43) is dense and tough and creates an effective barrier to extension of the prostatic malignant process

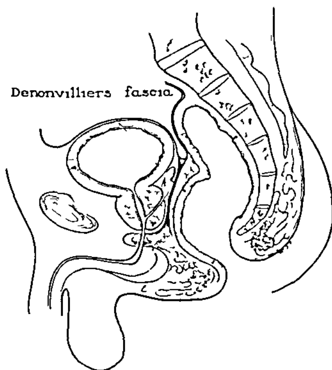


Fig 43 Denonvilliers fascia or prostatoperineal membrane (Reproduced with permission of the publishers from Jackman R J and Hilsabeck J R Extrinsic Lesions Which Invade the Lower Part of the Intestine *S Clin North America* 31 1041 1051 [Aug] 1951)

Lazarus described three possible ways in which the rectum may be invaded by carcinoma of the prostate gland He wrote

In the first place the rectal lumen may be occluded by pressure of the pelvic structures involved in a diffuse invasion which binds the prostate seminal vesicles bladder and rectum into a firm mass to the pelvic bones The tumor may extend into the wall of the rectum and start to grow there as an intramural tumor causing occlusion of the lumen without actually invading the mucosa Finally the tumor may extend directly through the entire thickness of the rectal wall and present itself as a fungating growth in the lumen This latter type is extremely rare and can only be differentiated from a primary carcinoma of the rectum by histologic examination

I have encountered patients in whom the rectal mucosa was observed to lie in prominent fixed folds over the prostatic mass not unlike the puckered appearance of the mucosa overlying an invading endometrial mass These folds bleed more readily than normal on slight trauma and specimens from the area removed for biopsy sometimes show prostatic adenocarcinoma invading the rectal mucosa

Classification —In 1952 Anderson and I[6] made a study of the prostatic cancers that involved the rectum seen in an eight year period at the Mayo Clinic We classified them into three groups as follows

Group 1 —This group is constituted by carcinoma of the prostate gland which produces an *extrarectal mass* that bulges into or impinges on the rectal lumen and prevents passage of the proctoscope for the usual distance

Group 2 —This group is comprised of carcinoma of the prostate gland that encircles the rectum and decreases the caliber of the lumen The resultant lesion presents as an *annular hourglass type of stricture*

Group 3 —In this group is carcinoma of the prostate gland that *invades the rectal mucosa* with or without either of the first two manifestations (Plate 44)

This study amounted to a total of twenty seven patients The lesions of fourteen were in group 1 the lesions of two were

in group 2 and the lesions of eleven were in group 3 Specimens of tissue for biopsy were obtained at the time of proctoscopic examination and also at the time of cystoscopy and transurethral resection in eight cases Stained sections of these specimens were compared and in each instance the appearance of the carcinoma was identical in both locations The primary lesion in each instance was the prostate gland

We had encountered instances of primary carcinoma of the rectum that had invaded the prostate gland we also found simultaneously occurring but separate primary tumors of the rectum and prostate gland so that it is well to keep the possibility of such an association in mind even though it happens infrequently The pertinent data in a few *illustrative cases* representing each group follow

FOUR ILLUSTRATIVE CASES

Case 1 –(Group 1 extrarectal mass) A man sixty seven years old registered at the clinic on December 4 1946 He had had constipation of gradually increasing severity for the preceding year and occasionally had noticed a burning sensation in the urethra when he urinated For the preceding six months to a year he had had to void two or three times each night The urinary stream was of normal caliber and there was no hesitancy or dribbling Noteworthy physical signs were encountered only during digital examination of the rectum A large, hard irregular mass was palpable in the region of the prostate gland Sigmoidoscopy was performed on December 7 to a distance of 12 cm A large fixed irregular mass situated outside the lumen of the rectum prevented passage of the instrument to higher levels The mucosa was normal Catheterization of the bladder after voiding revealed no residual urine

Roentgenologic examination of the thorax and the lumbar portion of the spinal column disclosed no evidence of metastasis Laboratory examination of the blood revealed the following values hemoglobin 14 4 gm per 100 cc urea 48 mg per 100 cc alkaline phosphatase 4 6 King Armstrong units acid phosphatase 61 4 King Armstrong units sedimentation rate 26 mm in one hour (Westergren method)

Transurethral resection was not performed because the patient

had few urinary complaints and no residual urine He was advised to take 1 mg of diethylstilbestrol three times a day at home under the care of his local physician

The patient returned to the clinic on January 8 1948 He had been unable to take the recommended dose of diethylstilbestrol because his breasts had become tender and enlarged He had no complaints referable to the urinary tract and he voided only once at night He was able to control his bowel movements with the use of mineral oil and dietary measures Digital examination of the rectum revealed a marked change in the mass One observer wrote I do not believe I could diagnose carcinoma if I had not felt this lesion one year ago The prostate gland was described as moderately enlarged and soft although it was still somewhat nodular Roentgenologic examination of the thorax did not reveal metastasis The patient was advised to continue to take diethyl stilbestrol in as high a dose as he could tolerate

Case 2 —(Group 2 rectal stricture) A man seventy one years old was first seen because of constipation which had been present in mild degree for three years and which had become severe in the preceding two months The bladder was found to be markedly distended Digital rectal examination revealed an annular con striction at the level of the prostate gland which was hard and fixed The mucosa felt intact Proctoscopic examination with a small caliber instrument was performed to a distance of 20 cm The bladder was decompressed by means of an indwelling catheter Concentration of urea in the blood was gradually reduced from 188 to 102 mg per 100 cc Cystoscopy and transurethral resection disclosed a contracture at the vesical neck caused by malignant involvement of the prostate gland To open the vesical neck 6 gm of tissue was removed The pathologist reported the tissue to be grade 3 adenocarcinoma The patient was advised to take 0 5 mg of diethylstilbestrol daily He was voiding urine normally at the time of dismissal and correspondence indicated that he was alive and well three years later

Case 3 —(Group 3 invasion of rectal mucosa) A man seventy years old was first seen because of symptoms referable to the urinary tract Digital examination revealed a very hard and moderately enlarged prostate gland Cystoscopy and transurethral resection were performed There was typical malignant infiltration

at the vesical neck and this area was very fixed 12 gm of tissue was removed The pathologist reported grade 2 adenocarcinoma At the time of dismissal the patient was voiding normally

The patient returned three years later He had felt well until the preceding two months during which time he had had constipation that required him to take laxative agents daily He had bowel movements only every second or third day and each time the stools contained blood The patient also had noticed some slowness of the urinary stream and dribbling Digital examination of the rectum revealed a frozen pelvis The examiner was unable to insert his finger through a stenotic area in the rectum The surrounding mass was fixed and hard Proctoscopic examination was performed to a distance of 14 cm There was a hard, fixed area of extrarectal infiltration The overlying mucosa bled easily but no malignant tissue could be seen on the surface A moderate degree of obstruction of the lumen was present Histologic examination of tissue removed from the mucosa disclosed grade 2 adenocarcinoma which did not appear to be primary in the rectum The patient was advised to take diethylstilbestrol in a dose of 3 mg per day and was dismissed

He returned a year later because of severe constipation and a loss of thirty five pounds Urination had been satisfactory The patient had a moderate degree of obstruction of the colon and the performance of palliative colostomy was considered as a means of relief However medical measures were successful in relieving the obstruction The patient was advised to continue these measures at home Ten months after his last visit we were informed of his death

The following case is reported because it is typical of one in which both symptoms and findings pointed to a primary carcinoma of the rectum but which actually were caused by a fungating rectal growth of prostatic origin that overlay the prostate gland and produced minimal symptoms referable to the urinary tract

Case 4 —(Primary carcinoma of the prostate gland with fungating rectal invasion) A man sixty six years old came to the clinic because of rectal bleeding and difficulty in getting his bowels to move Rectal carcinoma had been diagnosed elsewhere Procto

scopic examination was performed to a distance of 16 cm An ulcerated fungating lesion about 1 by 4 cm overlay the prostate gland with a site of infiltration outside the rectum and seemingly attached to the prostate gland Biopsy disclosed grade 2 adeno carcinoma Two tiny polyps 3 or 4 mm in diameter were found to be situated above the lesion and were fulgurated the mucosa otherwise was normal Because of the location of the lesion and fixation to the prostate gland the proctoscopist considered a possible prostatic origin of the neoplasm even though symptoms referable to the urinary tract were minimal Cystoscopic examination and transurethral resection were performed In the midline the enlargement was approximately 5 cm in length and 3 cm in width thus suggested involvement of the posterior lobe of the prostate gland The lateral lobes were enlarged moderately The prostatic urethra was considerably fixed and appeared to be very obstructive To open the vesical neck 10 gm of tissue was removed The pathologist made a diagosis of adenocarcinoma and believed that the primary lesion was prostatic

The patient subsequently was dismissed with instructions to take diethylstilbestrol in a dose of 3 mg per day When he returned about three months later it was seen that the rectal growth had changed but little so radium was applied When he was seen four months later the patient felt much improved Digital examination of the rectum revealed nodular carcinoma in the region of the prostate gland There was no rectal obstruction and open ulceration of the rectal mucosa could not be detected We were informed of his death 2½ years later

Comment on Cases — A review of twenty seven cases of carcinoma of the prostate gland that had invaded the wall of the rectum obstructing the lumen of that structure or producing an extra rectal mass demonstrated that considerable confusion can and does arise in respect to the diagnosis The most unfortunate error which can easily occur is to make a diagnosis of primary carcinoma of the rectum in those cases in which invasion of the mucosa has occurred secondarily from the prostatic lesion In some of these cases only minimal symptoms referable to the urinary tract are present and unless this possibility is kept in mind an extensive but futile operative procedure may be undertaken Carcinoma of the prostate gland should be considered as a possible etiologic

factor in an indeterminate rectal stricture of the male—in one of our cases the patient had been treated for lymphogranuloma inguinale The length of time necessary for rectal involvement to occur cannot be given with accuracy The interval that elapsed between the establishment of the diagnosis of carcinoma of the *prostate gland* and the diagnosis of obstruction of the lumen of the rectum varied in six cases the two conditions were diagnosed simultaneously at the time of the first examination whereas at the other extreme were the cases in which the interval was more than three years between the two diagnoses

Obstruction of the rectum occurred and became increasingly worse in several patients who either had undergone orchiectomy or therapy with diethylstilbestrol previously Colostomy was performed as a palliative measure in one case in this series This procedure was considered for other patients but sufficient relief *of obstruction was obtained by means of enemas laxative agents* and dietary regulation to make performance of colostomy unnecessary

It is highly probable that more patients with rectal lesions resulting from carcinoma of the prostate gland will be seen in the *future than are seen now* As said previously the comfortable survival of patients for several years after orchiectomy or the institution of adequate therapy with diethylstilbestrol may allow more time for invasion or encirclement of the rectum *by the* primary lesion in the prostate gland

Proctoscopic Picture—In some cases when obstruction obviously is entirely extramucosal the lining of the rectum will appear to be normal except for a narrowed ring of tissue or a large bulging mass arising from the *prostate gland When the mucosa* is invaded several different features may be seen *Thickened mucosal folds* which bl- sily upon trauma but appear other-
wise normal will be iopsy to contain rcinoma
of the prostate gla ong relatively lands of
the rectal *mucosa* At *ating lesion* nd in the
rectum This may ishable on of gross
appearance from a ioma of tl In a few
instances the only ev cinoma i ie rectum
ay be a slight *erosio* *a* or a s l

The removal of specimens of tissue from all such suspicious areas for histologic examination has been very helpful in establishing the diagnosis The microscopic characteristics of these lesions are such that distinction of them from primary carcinoma of the rectum usually can be made by the pathologist

In view of the findings in this group of patients it is recommended that cystoscopy be performed for men who have carcinoma of the rectum and who have any urinary symptoms before radical operations for rectal lesions are performed It is particularly important that this be done if the prostate gland cannot be identified digitally as being separate from the rectal carcinoma It is also recommended that a specimen of tissue from a rectal carcinoma be examined microscopically before resection of the rectum is performed Routine performance of these two procedures will prevent an extensive rectal operation for a secondary lesion arising from the prostate gland

Carcinoma of the Seminal Vesicle—This lesion must be very rare I cannot recall ever having observed an instance in which a primary carcinoma of the seminal vesicle involved the rectum It is generally thought that the lesion remains silent until it spreads to the prostate gland and then is mistakenly diagnosed as carcinoma of that gland McCrea reported three cases of primary carcinoma of the seminal vesicles He described the clinical findings which serve to distinguish the lesion from carcinoma of the rectum and from prostatic carcinoma

Carcinoma of the Urethra—Carcinoma of the urethra is uncommon When it occurs it rarely extends into the rectum I have seen one instance in which a squamous epithelioma of a congenital diverticulum of the posterior urethra had invaded the rectum

Carcinoma of the Ovary—It is our impression that with the exception of carcinoma of the prostate gland carcinoma of the ovary is the extrinsic malignant process most likely to invade the lower part of the intestine In 1951 we reported five cases in which an ovarian neoplasm had invaded the wall of the bowel In three of these cases proctoscopy disclosed what grossly appeared to be a large polyp associated with an extrarectal mass (Plate 45) in the other two cases a small ulcerating lesion overlying a large

mass in the cul-de sac of Douglas was found Because of the history and the presence of much extrinsic infiltration adjacent to the rectal lesion the latter lesion was believed to be extrinsic in origin in all five cases Specimens of tissue removed for biopsy from the rectal lesion revealed a low grade papillary adenocarcinoma which contained psammoma bodies Dockerty wrote that if such a lesion is found in the rectum of a female patient it may be considered to be ovarian in origin since papillary carcinoma of the thyroid gland is the only other lesion that contains psammoma bodies Papillary carcinoma of the thyroid gland however rarely metastasizes to the rectum

Carcinoma of the Uterus, Cervix or Vagina—This type of carcinoma may invade the rectal wall If so the lesion is far advanced and although the symptoms may suggest primary carcinoma of the intestine a history of previous pelvic operations or the use of radium plus extensive infiltration in the cul-de-sac of Douglas or the rectovaginal septum should alert the examiner to the possible extrinsic source

INFLAMMATORY LESIONS AND FOREIGN BODIES

Pelvic Abscess—A pelvic abscess resulting from a ruptured appendix or other causes may point in the region of the cul-de sac of Douglas or rectovesical space and either rupture spontaneously or be drained surgically into the rectum

Fistulization in Regional Ileitis—The tendency for fistulous tracts to form in the presence of regional ileitis is well known The fistula may arise in a dependent loop of diseased ileum and penetrate the rectum An unexplained isolated rectal granuloma especially if it is associated with an extrarectal mass should make the examiner suspicious of this possibility (See Chapter IX)

Foreign Bodies in Abdomen—Foreign bodies left in the abdomen at the time of operation may erode through the rectal wall

SUMMARY

A rather wide variety of extrinsic lesions may invade the lower part of the intestine *In the male, carcinoma of the prostate*

gland and in the female carcinoma of the ovary are the neoplasms that are most likely to invade the lower part of the intestine secondarily

Endometriosis occurs rather commonly as an extrarectal mass but it rarely penetrates through the rectal mucosa

In some cases in which an extrinsic lesion involves the intestine the intestinal lesion may be mistaken for the primary growth

Although biopsy may be of value in differential diagnosis it frequently is impossible to determine the original site of a highly anaplastic lesion prior to pathologic examination of the surgical specimen

The use of transrectal needle biopsy in certain selected extrinsic lesions which has been discussed previously (Chapter IV) has been of value in some cases

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Chapter XV

EXTRARECTAL MASSES IN THE RECTO UTERINE AND RECTOVESICAL SPACE

Since the cul-de-sac of Douglas or the rectovesical space is the most dependent part of the abdomen it is only logical to assume that a variety of malignant and inflammatory processes would gravitate to this location

BLUMER S SHELF

A mass in this location sometimes is spoken of as Blumer s shelf because of Blumer s description of it in 1909[1] (Fig 44) The shelf can be a metastatic or an implanted growth or an inflammatory process If it is inflammatory it usually is incom plete or one sided

SEVEN CAUSES OF TUMOR MASSES IN RECTOVESICAL OR RECTO UTERINE SPACE

In 1941 we made a study of 254 consecutive cases in which tumor masses had been found in the rectovesical or recto uterine space The records of the patients were studied to determine what produced the mass as decided by the results of clinical roentgeno logic surgical or postmortem examinations More than half or 54 3 per cent (138) of the patients were female while 45 7 per cent (116) were male Pelvic tumors arising from the female genitalia are fairly common thus explaining the preponderance of women in this study The causes of these masses were distributed in seven groups

Pelvic Implants From Lesions in the Upper Part of the Abdomen and Pelvic Metastatic Lesions—These conditions were represented by forty two patients or 16 6 per cent of the 254 in this series Thirty were men and twelve were women The

relative infrequency with which these conditions are found among women is explained by the mode of *invasion of the recto-uterine* and rectovesical spaces Fragments of malignant tissue gravitate to the most dependent part of the abdomen and become implanted there In women the gravitating cells are sometimes stopped by and engrafted on the ovaries (Krukenberg tumor) Another reason for the disproportion of the occurrence according to sex is that carcinomas of the upper part of the abdomen and especially cancer of the stomach and pancreas occur less frequently among women than among men

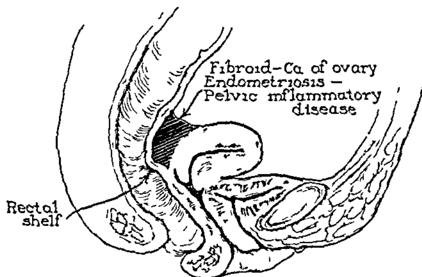


Fig 44 Mass in recto-uterine space producing a shelflike process

Eight of the patients in this group of forty two complained chiefly of some condition referable to the pelvic implant, rather than to the primary growth

Proctoscopic examination was carried out in all the patients of this group and in none of them was the malignant lesion found to have penetrated the rectal mucosa

Two of the forty two extrarectal masses occurred in women who had primary lesions in the breast The pelvic implant probably resulted from gravitation of cells from metastasis to the liver

Lesions of the Colon and Small Intestine Causing Extrarectal Masses —There were fifty eight patients (22 8 per cent) in this

group thirty three of whom were males and twenty five of whom were females The lesions of the large intestine which produced the mass in the pelvis were *carcinoma of the sigmoid* and *cecum* and *diverticulitis* usually of the sigmoid colon All the carcinomas had a considerable inflammatory component or had perforated causing them to be fixed in the lowest part of the pelvis

The only lesion of the small intestine that caused an anterior extrarectal mass was *regional ileitis* or *ileocolitis*

Lesions of the Genitourinary System —Patients with such lesions constituted almost half of the 251 patients (107 or 42.1 per cent) in the series Eighty six were women and twenty-one were men Malignant lesions predominated among the men and inflammatory lesions among the women Since the advent of antibiotic agents cul-de-sac masses originating as pelvic inflammatory processes are seldom encountered Endometriosis pelvic inflammatory disease and carcinoma of the ovary and cervix were the commonest causes of extrarectal masses among women while carcinoma of the prostate gland was the most frequent cause of such masses among men

It is interesting to note that the chief complaint of more than half of these 107 patients was high rectal pain change in bowel habits or a sense of rectal fullness

Abdominal Carcinomatosis —Abdominal carcinomatosis accounted for 21 of the anterior extrarectal masses The primary source of the carcinoma was not definitely discovered even though about half of the patients underwent abdominal exploration

Retroperitoneal Tumors —Retroperitoneal tumors constituted six of the group Four of these turned out to be retroperitoneal sarcomas and two proved to be lymphosarcomas

Lipoid Granulomas —Three of the high rectal masses which seemed to be situated in the cul-de-sac of Douglas or rectovesical space were caused by injection treatment for hemorrhoids and were demonstrated by biopsy to be oil granulomas Yet it is almost inconceivable that a medium injected during the treatment of internal hemorrhoids could be placed that high up in the rectum What happened I suspect was that the procedure was carried out with the patient in the lithotomy position in which the

pelvis is tilted downward In such a position if the patient was elderly and had poor muscle tone the upper rectal zone could bulge downward and be mistakenly identified as *the internal* hemorrhoidal zone

Miscellaneous Group —The lesions in this group affected seventeen patients (6 7 per cent) most of whom had had localized or generalized peritonitis at some time resulting from a perforated ulcer or a uterus with a variable amount of inflammatory reaction

PROCTOSCOPY OF PATIENTS WITH EXTRARECTAL MASSES

Proctoscopy is important in determination of (1) whether the mass is extrarectal (2) whether or not it has penetrated the wall of the bowel and (3) the degree of impingement of the mass on the lumen of the bowel Frequently it is impossible to pass the proctoscope *the entire distance because of fixation of the bowel* at the site of the mass and because the caliber of the lumen of the bowel is diminished by the mass A proctoscope of smaller caliber probably will permit higher examination in such cases and sometimes more information

Much can be learned by digital examination of these anterior masses Shelflike hard symmetrical masses (Fig 41) are more likely than not to be malignant One sided or asymmetrical softer masses which do not have the shelflike feel are more likely to be inflammatory

MASS IN THE CUL-DE-SAC IN THE FEMALE

By far the commonest cause of a firm fixed mass in the cul-de-sac of *the female is endometriosis* If the woman is between the ages of thirty and fifty years and has been sterile it is still more likely that the mass is endometrial Endometrial masses do not have the shelflike feel (See Chapter XIV)

RECTOVESICAL MASS IN THE MALE

The commonest causes of a rectovesical mass in the male are implants from carcinoma of the stomach and pancreas followed in frequency of occurrence by diverticulitis Some prostatic lesions that cause an anterior extrarectal mass cannot be disassociated from the prostatic area when palpation is done

NEEDLE BIOPSY

Transrectal needle biopsy, which is discussed elsewhere, is of value in the differential diagnosis of certain selected instances of solid tumors in the rectovesical or recto-uterine space.

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COLOR ATLAS

Plate I About 70 per cent of all organic diseases of the large intestine inflammatory benign and malignant occur in the distal portion of that structure and therefore can be diagnosed more readily with the average 25 cm proctoscope than by any other instrument or method

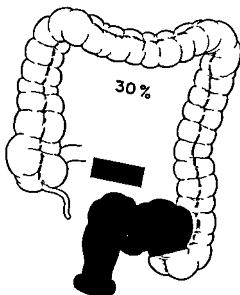

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Plate 2. Normal mucosa. (See Chapter V.) This photograph was taken immediately after the use of a warm retention enema. The considerable injection of the blood vessels is not significant, does not indicate organic disease and frequently is seen after various types of enemas have been used. (x3)

Plate 3. Normal mucosa. This is the same area of rectal mucosa as that shown in Plate 2 one hour later. The injected blood vessels are much less obvious. (x3)

Plate 4. Normal mucosa. The vascular pattern is completely absent and yet this is normal mucosa. Degrees of pallor or redness of the mucosa of the lower bowel, although possibly indicating organic disease, may be deceiving. (x3)

Plate 5. Normal mucosa. Enlarged lymph follicles frequently give a pebbly or polypoid appearance to the mucosa. These are also spoken of as lymphomas. (See Chapter VIII.) The presence of blood in the photograph resulted from the removal of one of the follicles for microscopic section since grossly it was thought to be an adenomatous polyp. (x3)

Plate 6. Traumatic ulceration. (See Chapter VI.) The bleeding ulcer indicated by the arrow was produced by a misdirected enema tip. (x3) (See Figure 15.)

Plate 7. Chemical proctitis. (See Chapter VI.) Produced by a hydrogen peroxide enema. *Objectively* the process is indistinguishable from certain early acute processes such as bacillary dysentery or early chronic ulcerative colitis. (x3)

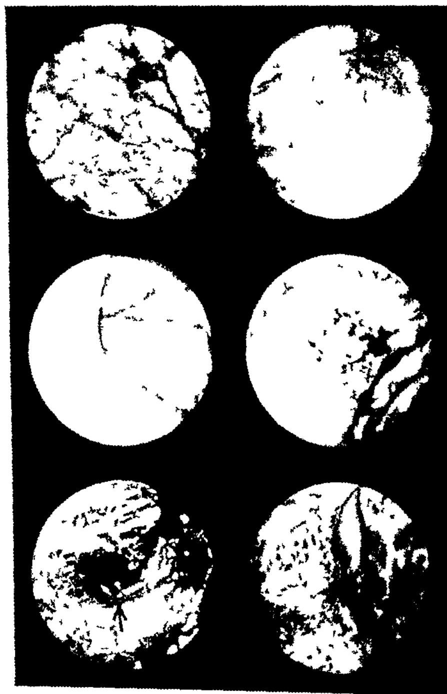


Plate 8 Radiation proctitis (See *Chapter VI*) *This* particular area *shows scarring* and telengiectasis which will persist indefinitely (x3) *Previously* this site was ulcerated but is now healed

Plate 9 Radiation proctitis (See Chapter VI) Acute phase showing edematous friable mucosa which bleeds very easily (x3) This particular area was located on the anterior rectal wall adjacent to the uterine *cervix to which radium had been ap*plied two months previously Sloughing did not occur

Plate 10 Radiation *proctitis (See* Chapter VI) This shows ulceration covered by a light gray tenacious *slough at the top of the picture* The lower part of the picture shows intact edematous mucosa that bleeds easily

Plate 11 Radiation proctitis (See Chapter VI) Stricture also is present (x3) The strictured site replaces what was *formerly a large sloughing zone* and it represents the body's natural attempt at healing

Plate 12 Entamoeba *histolytica* ulcers (See Chapter VIII) Discrete ulcers in the rectal mucosa of a patient who had a very active infection (x3) It is exceptional to see this many ulcers in a single field The arrow points to a raised umbilicated ulcer —one which is considered typical and diagnostic

Plate 13 Tuberculous ulcer (See Chapter XI) This picture shows scarring and tufts of granulation tissue or tubercles which eventually coalesced and created a large tuberculous ulcer (x3) Active pulmonary tuberculosis in this patient *aroused* suspicions that the process shown was tuberculous



Plate 14 Chronic ulcerative colitis This shows stage 1 of the disease (x3) (See Chapter VII) Notice the similarity of the appearance to that in Plate 7 (acute chemical proctitis) and Plate 9 (acute radiation proctitis) This picture shows mucosal edema submucosal petechial hemorrhages and a mucosa that bleeds easily on slight trauma One might suspect early chronic ulcerative colitis in this stage but the picture is not diagnostic The history is helpful in arrival at the differential diagnosis

Plate 15 Chronic ulcerative colitis This shows stage 2 of the disease (x3) (See Chapter VII) Notice the variable sized lighter yellowish spots which presumably are tiny abscesses resulting from infarcts in the end blood vessels

Plate 16 Chronic ulcerative colitis This shows stage 3 of the disease (x3) (See Chapter VII) This is the usual picture seen in active chronic ulcerative colitis It is diagnostic and should not be confused with any other type of colitis The mucosa is granular and bleeds easily on slight trauma

Plate 17 Chronic ulcerative colitis This shows stage 3 of the disease (x3) (See Chapter VII) This is also a typical and diagnostic picture The granules are perhaps a little coarser than in Plate 16 and the disease is a little less active as manifested by lack of bleeding and only slight edema

Plate 18 Chronic ulcerative colitis This shows stage 4 of the disease (x3) (See Chapter VII) An inactive or quiescent stage of the disease is manifested by scarring pallor of the mucosa irregular valve edge and contracted tubular lumen

Plate 19 Chronic ulcerative colitis with polyps (x3) (See Chapter VII) The arrows point to polypoid bridges or straps which are attached at both ends but their centers can be lifted up and an instrument can be passed beneath the bridges The surrounding lighter scarred areas were at one time completely denuded of mucosa This is not an uncommon picture of old inactive or healed chronic ulcerative colitis (The hemorrhagic spots are traumatic from instrumentation)

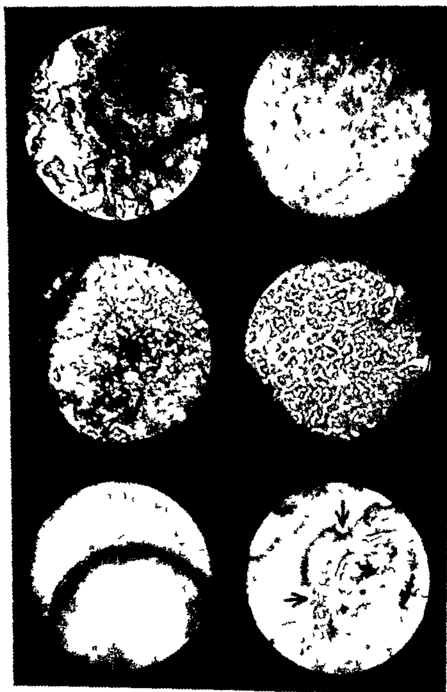


Plate 20 Chronic ulcerative colitis with polyps (x3) (See Chapter VII) This is another polypoid mucosal bridge (arrow) There is a little more activity of the colitis as manifested by the bleeding and fine granularity in the upper scarred zone Tissue taken from the mucosal strap showed inflammatory mucosa

Plate 21 Chronic ulcerative colitis with polyps (x3) (See Chapter VII) In this instance the polyps are not discrete but all of the mucosa in this picture appears polypoid and edematous Tissue taken for biopsy from area to which arrow points, proved to be adenomatous

Plate 22 Chronic ulcerative colitis with early low grade carcinoma (x3) (See Chapter VII) The colitis is relatively quiescent here but tissue taken from the raised polypoid area at the top of the picture proved to be a grade I adenocarcinoma microscopically

Plate 23 Chronic ulcerative colitis with stricture and polyps (x3) (See Chapter VII) Multiple complications are the rule rather than the exception among persons in whom complications occur The arrow points to a polyp at the edge of a stricture

Plate 24 Adenomatous polyp (x3) (See Chapter X) A small polyp such as this can be fulgurated at the time of the initial proctoscopy

Plate 25 Adenomatous polyp (x3) (See Chapter X) The view is the same as in Plate 24 immediately after fulguration of the polyp The charred area extends well around the periphery

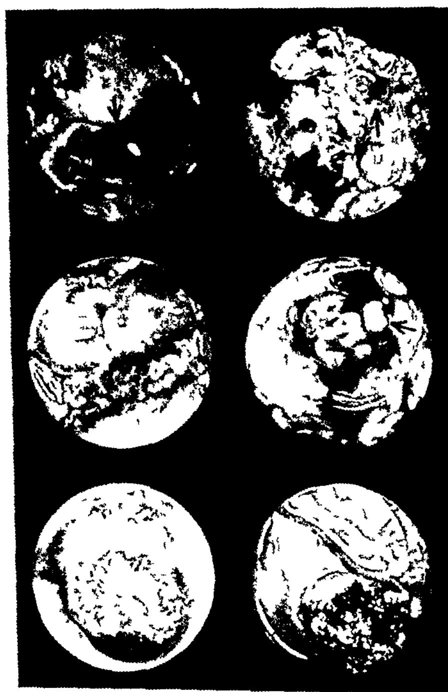


Plate 26 Pedunculated polyp (x3) *(See Chapter X)* Fulguration was *carried out successfully* even though the tissue taken from the tip of this *polyp proved to be low grade I adeno*carcinoma within an adenoma

Plate 27 Sessile polyp (x3) (See Chapter X) Study of microscopic sections from this polyp disclosed adenoma—(villous type) fulguration is feasible It is carried out fractionally

Plate 28 Multiple polyposis—familial (x3) (See Chapter X) The polyps are discrete and fulguration is feasible Notice the intervening normal mucosa

Plate 29 Multiple polyposis—familial (x3) (See Chapter X) There is no intervening normal mucosa There fore fulguration is not feasible be cause the resulting constricted lumen of the bowel would preclude subse quent examinations

Plate 30 Peutz Jeghers syndrome (See Chapter X) Melanin spots on the lips are one of the most constant features of the syndrome (x3)

Plate 31 Peutz Jeghers syndrome (See Chapter X) Sessile adenomatous lesions in the sigmoid colon of the same patient concerned in Plate 30 Polyps occurring in the large intestine in the presence of this syndrome tend to be villous in gross appearance

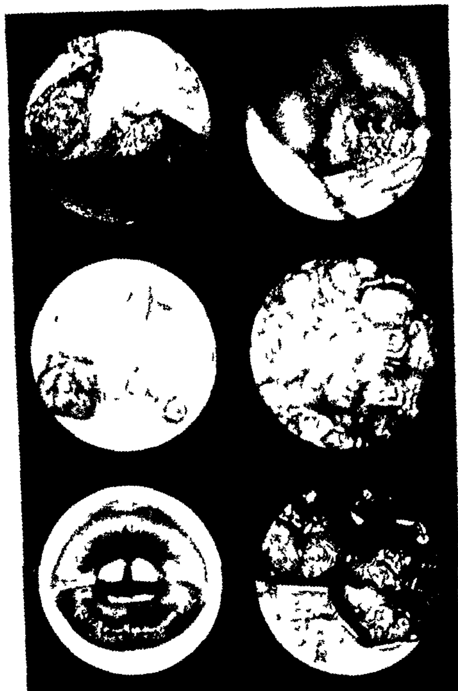


Plate 32 Adenocarcinoma of the rectum (x3) (See Chapter XI) Notice the crateriform nature of the lesion that is the scooped out center and raised edges of the lesion This gross appearance immediately takes it out of the category of polyps or adenomas and assigns it to the malignant group

Plate 33 Adenocarcinoma of the sigmoid (See Chapter XI) The lesion is annular and of the obstructing type (x3) Active bleeding almost obscures the lumen through the carcinoma The arrow points to the lumen

Plate 34 Adenocarcinoma of the rectum (x3) (See Chapter XI) This depicts well the abrupt change from the normal mucosa to the raised red proliferative appearing neoplasm

Plate 35 Rectovaginal fistula (x3) (See Chapter VI and Plates 8 through 11) The fistula (lower arrow) resulted from the application of radium to a carcinoma of the cervix The upper arrow points to the lumen of the bowel

Plate 36 Submucosal nodule—carcinoid (x3) (See Chapter XIII) A typical gross appearance such as this is very suggestive of carcinoid Notice the yellowish cast to the nodule through the intact overlying mucosa The orange or yellowish appearance is due to the cephalin content of the carcinoid

Plate 37 Submucosal nodule—leiomyoma (x3) (See Chapter XIII) There is nothing about the gross appearance of this submucosal nodule that would indicate leiomyoma The diagnosis was made after excision and microscopic examination of tissue The location size and consistency might be of help in the differential diagnosis



Plate 38 Submucosal nodule—lipoma (x3) (See Chapter XIII) The raised area almost fills the entire field and gives a yellowish hue through the intact overlying mucosa The minute red dots are erosion ulcers and are not significant The soft consistency and yellowish appearance are distinguishing features

Plate 39 Hemangioma (See Chapter XIII) *The gross appearance varies* considerably (x3) Hemangiomas may closely resemble adenomatous polyps. Usually they give a bluish red cast through the intact overlying normal mucosa The hemangiomatous masses are soft and compressible (See *also Plate 75*)

Plate 40 Pneumatosis cystoides intestinalis (x3) (See Chapter XIII) The mucosa gives the appearance of being stretched tightly over the gas cyst The mucosal *blood* vessels appear telangiectatic Rubbing a cotton swab *over* the mucosa causes the tiny vessels to break and ooze

Plate 41 Pneumatosis cystoides intestinalis (x3) (See Chapter XIII) Multiple submucosal gas cysts Grossly these were classed as submucosal *nodules probably lymphoid in origin* One of the cysts deflated during an attempt to remove a specimen for biopsy

Plate 42 Inflammatory rectal stricture—old lymphogranuloma venereum *(x3) (See Chapter XIII)* The light color is the result of the dense relatively avascular scar The abrasion on the right wall of the stricture was caused by an attempt to pass the proctoscope through the site of the stricture

Plate 43 *Endometrioma* (See Chapter XIV) The lesion is invading the wall of the bowel in the region of the cul-de-sac (x3) A specimen of tissue taken for biopsy proved to be endometrial tissue with *intact overlying* intestinal mucosa This photograph was *taken three* days before the regular men trual period At the time of the period the mass could be seen actively menstruating

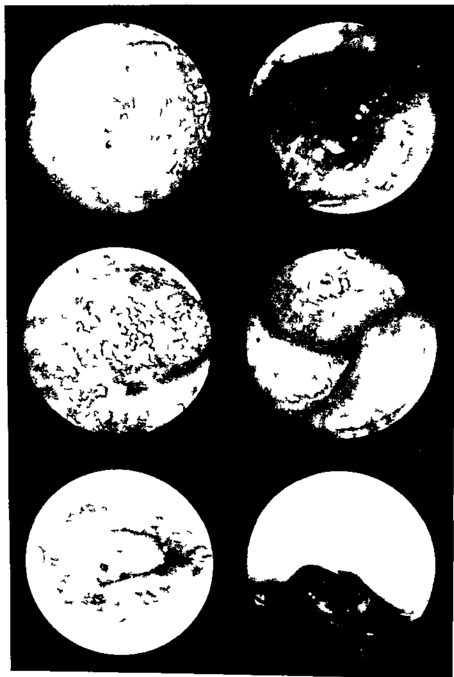


Plate 44 Carcinoma of the prostate gland (x3) (See Chapter XIV) The lesion is invading through the anterior rectal wall Specimens of tissue removed from the raised lighter colored areas proved to be malignant The location history and consistency helped to distinguish it from primary carcinoma of the rectum

Plate 45 Extrinsic carcinoma (See Chapter XIV) The lesion is invading the wall of the bowel (x3) The arrow points to a raised reddened area which is edematous mucosa A specimen of tissue removed for biopsy from beneath this site proved to be papillary adenocarcinoma containing psammoma bodies which was presumed to have arisen in the ovary

Plate 46 A small rectal polyp (x3) (See Chapter XVII) A lesion such as this is rarely the source of transanal bleeding Polyps such as this constitute the majority of those found on routine proctoscopic examination of members of the older age groups

Plate 47 Bleeding pedunculated polyp (x3) (See Chapter XVII) Pedunculated polyps of any considerable size act as foreign bodies tend to be propelled along become strangulated and consequently bleed

Plate 48 Site of resection (See Chapter XXI) Stricture (arrow) at the site of anastomosis after resection for carcinoma of the sigmoid (x3) Some constriction of the lumen at the site of resection is the rule rather than the exception A lumen of 1 cm through the site of stricture frequently is adequate

Plate 49 Retrorectal teratoma (See Chapter XVI) The tooth shown in the picture projected through the mucosa of the posterior rectal wall from a presacral teratoma (x3)

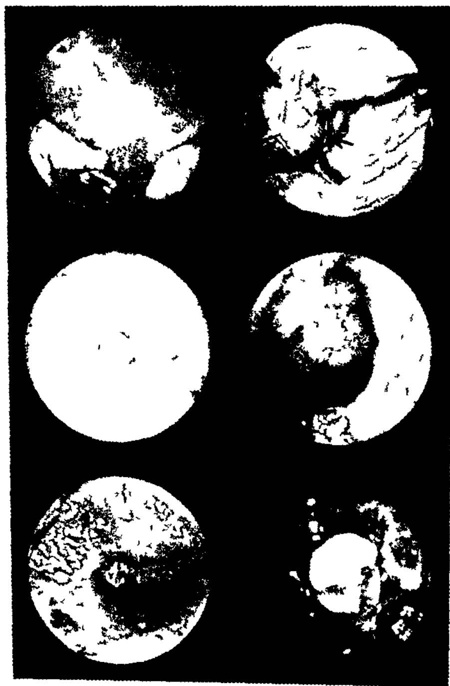


Plate 50 Sacculation (See Chapter XXIV) The reddened circular ridge is the rim of the saccule (x3) These sacculations are weak places in the muscularis (not to be confused with normal haustrations) and sometimes a diverticulum is seen in the depths of the saccule

Plate 51 Diverticulum (See Chapter XXIV) The diverticulum contains an inspissated cast of stool (x3) The surrounding mucosal redness and edema indicate an inflammatory process of diverticulitis

Plate 52 Diverticulum In this instance the diverticulum is partially everted (x3) (See Chapter XXIV) Subsequent insufflation of the structure with air from the bellows blew it back out

Plate 53 Diverticulum The diverticulum is completely everted (x3) (See Chapter XXIV) When a diverticulum is everted as in this picture it may be mistaken for a small polyp and obviously dire consequences would be created if it were fulgurated Upper arrow points to tip of everted diverticulum and lower arrow to base of it

Plate 54 Melanosis coli (See Chapter XXV) Notice the mottled appearance (x3) The melanin spots are polyhedral The pigment is in the deep layers of mucosa and submucosa (See Figure 53)

Plate 55 Leukoplakia (See Chapter XXVI) A strip of leukoplakia extends upward from the anus and on to the rectal mucosa (x3) The contrast between the red mucosa and the white zone of leukoplakia is striking (See Figure 54)



Plate 56 Removed specimen. (See Chapter X.) The arrow points to a "sentinel polyp" above which is a *crateriform* carcinoma.

Plate 57 Hidradenitis suppurativa. (*See Chapter XXVII.*) Long-standing disease with multiple draining sinuses. Notice the surrounding small pitted scars. The large ulcerated zone in the center of the process is a grade 2 squamous-cell epithelioma.

Plate 58 Rectal prolapse—first degree. (See Chapter XIX.) Notice that the anus is completely everted as indicated by the absence of the sulcus. (See Figure 45*b*.)

Plate 59 Rectal prolapse—second degree. (See Chapter XIX.) Only the rectum is prolapsed while the anus remains intact. The thumb of the examiner is in the sulcus between the anus and the rectum. The index finger of the examiner is in the rectal lumen palpating the thickness of two rectal wall layers. (See Figure 45*c*.)

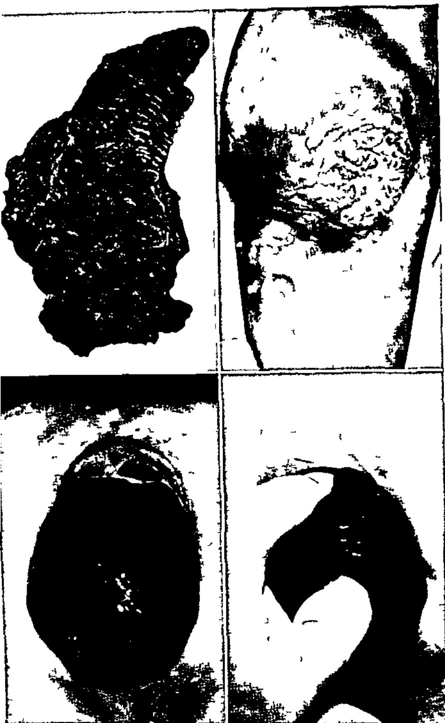


Plate 60 Actinodermatitis with ulceration (See Chapters XXVI and XXVIII) This process resulted from an overdose of roentgen rays in the treatment of anal pruritus Tissue taken from the gluteal-cleft ulcer proved to be low grade epithelioma The extensive surrounding zone of redness is telangiectasis

Plate 61 Islands of mucosal ectropion (See Chapter XXVIII) The arrows point to two small islands of misplaced rectal mucosa resulting from several surgical procedures. Such lesions sometimes are mistaken for some type of perianal ulceration

Plate 62 Anal and perianal squamous-cell epithelioma (See Chapter XXVI) Although the objective appearance of this type of lesion is very bizarre this illustration depicts well two constant features raised proliferative margins and ulceration

Plate 63 Basal cell epithelioma—rodent ulcer (See Chapter XXVI) The perianal location should be somewhat suggestive that this is a basal cell epithelioma since this lesion usually does not occur inside the anal canal



Plate 72 Precoccygeal dermoid cyst (See Chapter XVI) Extrarectal excision of a noninfected dermoid cyst The probe points to a funnel like dimple shown in Plate 71 A Hirschman anoscope is in the anus

Plate 73 Hypertrophied anal papilla (See Chapter X) The papilla is prolapsing through the anus. The reddened areas at the upper part of the lesion are excoriations resulting from trauma An enlarged papilla such as this is sometimes confused with an adenomatous polyp The former arises from the anal canal and is therefore covered with skin while the true adenoma grows from the bowel mucosa

Plate 74 (See Chapter XXVI) Perianal Paget's disease involving almost the entire perianal circumference The white patches are areas of maceration The reddened sharply demarcated zone of involvement is typical although it would be difficult clinically to distinguish this from perianal psoriasis Wide local excision of this lesion disclosed an underlying invasive grade 3 adenocarcinoma

Plate 75 Hemangiomas (See Chapter XXVIII) The bluish purple cast is characteristic Some of the small isolated tumors apart from the large cluster are lymphangiomas









During this fourteen year period there were 114 patients with palpable retrorectal tumors In general the patients could be divided into two main groups (1) *those with indeterminate tumors for which no tissue was available for diagnosis* and (2) *those with determinate tumors for which tissue was available*

INDETERMINATE TUMORS

Tissue was not removed from thirty two (28 per cent) of the 114 patients so that a definite diagnosis could not be made in these cases There were seventeen males and fifteen females The ages varied from one year to seventy six years The tumors were considered on the basis of proctoscopic clinical and roentgenologic studies to be malignant in nineteen cases benign in ten and indeterminate in three Obviously in this group a high percentage of lesions was thought to be malignant and the extent of the malignant process was a deterrent to the offering of surgical treatment to the patient

DETERMINATE TUMORS

It was with the group of eighty two patients who came to operation and from whom tissue was available for pathologic study that we were primarily concerned There were thirty nine women and forty three men We classified the tumors into five main categories (1) *inflammatory*, (2) *congenital* (3) *neurogenic*, (4) *osseous*, and (5) *miscellaneous*

Inflammatory Tumors—The inflammatory tumor is by far the commonest retrorectal mass Excluded of course are the infected dermoid tumors and teratomas which will be considered separately It should be pointed out that we are presenting data on only eighteen instances of this type of lesion encountered during the fourteen year period represented by our study but these comprise only those lesions which offered a problem in differential diagnosis because of their large size and the symptoms they produced Also it should be noted that during this same period there were many internal fistulas and lesser inflammatory processes which were not included in our study because the diagnosis was made readily However in several instances some of the

work of which were seen lymphocytes fibroblasts and foreign body giant cells

Treatment of internal abscesses and fistulas of the retrorectal region is the same as the treatment of other anorectal inflammatory processes Basically it consists of providing adequate drainage In some instances enlargement of the primary source and elimination of overhanging ledges with packing of the abscess cavity proved sufficient In other cases in which the process was more chronic it was necessary to lay the entire lesion open through an intrarectal approach It was sometimes necessary to use hot retention enemas or roentgen therapy during the postoperative course to produce complete resolution of the inflammatory process In the treatment of the chemical tumors it was impossible to remove all the mass in most instances because of its adherence and because the surgeon judged that complete removal would do the patient more harm than good The use of hot retention enemas and roentgen therapy frequently relieved the pain in the lower part of the back and pressure symptoms

The *prognosis* for patients with inflammatory tumors that is those of the nature of abscesses and fistulas is the same as that for patients who have other types of anorectal inflammation The sequence of events is infection in a crypt and spread of the process upward into the retrorectal space after which the extension of the abscess is limited only by the peritoneal reflections The initial abscess (1) may rupture producing a secondary opening higher up in the rectum (2) may drain back through its primary source producing an incomplete internal fistula or (3) may produce a chronic inflammatory reaction forming a walled off accumulation of pus

Chemical tumors result from the use of a mineral-oil medium in the injection treatment of internal hemorrhoids or rectal prolapse An oleoma type of tumefactive inflammatory reaction is set up The use of a 5 per cent solution of phenol in mineral oil will produce this tumefactive lesion almost without fail and it has been shown to be the mineral-oil base and not the phenol that is the offender Vegetable oils are much less likely to produce such a reaction The nature of these tumors may vary con

siderably from a small submucosal nodule to a large annular stricture We are considering here only the few cases in which the large oleoma was confined to the presacral region and presented a problem of differential diagnosis from other presacral lesions In two of the four cases considered herein the tumor filled the entire hollow of the sacrum

In the *differential diagnosis* of inflammatory tumors proctoscopic examination showed an overlying normal mucosa with a primary source and a secondary opening in some instances There was nothing in the symptoms which would distinguish definitely the tumors of the inflammatory type from those of other classes All the patients were adults in contradistinction to the fact that teratomas usually were seen in infants Roentgenologic studies of the sacrum and coccyx were of value in that for the most part they gave normal results Results of neurologic examination were not abnormal In the diagnosis of chemical tumors the history of an injection treatment was of value A definitive diagnosis was arrived at only on examination with the patient under the influence of anesthesia and by the removal of tissue for biopsy

Congenital Tumors—Several papers have been written on the embryologic factor in the pathogenesis of congenital tumors of the retrorectal region showing that this region is a site at which many complex fetal changes occur [6] We found in our study that the congenital type of retrorectal tumor had the greatest *incidence* of any of the tumors in the main classifications (32 patients or 39 per cent of those with determinate lesions) Fourteen of the thirty two congenital tumors were diagnosed as chordomas seven as teratomas five as dermoid cysts and six as meningoceles

Chordomas—Some authors have placed the chordomas in the osseous group but since chordomas presumably arise from fetal remnants of the notochord we have chosen to place them in the category of congenital tumors Although they generally are thought to be rare lesions we found them to be the commonest congenital tumor (fourteen of the thirty two cases) Nine of the fourteen patients were men and five were women The ages varied from thirty one to sixty nine years Although chordomas

may occur any place along the spinal column 70 per cent occur in the presacral region and can be palpated as a retrorectal mass on digital examination of the rectum Sections of tissue showed a cellular structure not unlike notochordal tissue that is physaliphorous or vacuolated mucus-containing cells There was a lobulated arrangement of the tumor cells which grew in cords From a histologic standpoint these tumors are benign but they may become malignant

The prognosis in all fourteen cases was poor because of local invasion and the inability of the surgeon to remove the tumors completely The best treatment is surgical the approach being through an incision from the anus to the sacrum with removal of the coccyx and part of the sacrum In all fourteen cases roentgen therapy was given but its value was questionable Dysfunction of the bladder due to pressure on nerves was almost constant Pain occurred early and was rectal gluteal perineal or occurring in the lower part of the back with or without extension to the sciatic region In eleven of the fourteen cases a history of trauma was given On digital examination the retrorectal tumor was hard smooth symmetrical and larger than most other lesions that occur in this region On *proctoscopic examination* the overlying mucous membrane was normal and intact in all cases

Roentgenologically, the most characteristic feature is that chordomas usually cause expansion of the sacrum especially in its anteroposterior diameter with a variable amount of destruction of the lower sacral segments Evidence of a soft tissue mass may be present The roentgenologic findings are difficult to distinguish from those of a giant-cell tumor of bone Two of these patients were examined while they were anesthetized and tissue was removed for microscopic study by an incision through the posterior rectal wall

Greenwald and associates pointed out that there is no typical roentgenologic picture of a vertebral chordoma and that the differential diagnosis encompasses all causes of bony destruction in the vertebral area They also wrote that destruction of bone frequently is inconspicuous or undetectable in the presence of sacrococcygeal chordoma because most of the lesion progresses

anteriorly impinging on the rectum In this event the predom inant symptoms are referable to the rectum and bladder Since the lesion is uncommon and without pathognomonic roentgeno logic features a high index of suspicion is essential for arrival at a diagnosis by clinical and roentgenographic methods

Transrectal needle biopsy is valuable in arrival at a definitive preoperative diagnosis but it carries with it the inherent risk of producing seeding of the tumor However in my opinion the advantage of a definitive preoperative diagnosis far out weighs this disadvantage (see Chapter IV)

Teratomas—The lesions of the seven patients with teratomas represented 9 per cent of all the definite tumors or 22 per cent of the congenital tumors These are the true *Middeldorpf tumors* All our seven patients were females and although the ages varied from two months to sixty one years five were one year old or less In two of the seven cases the lesion was considered malignant by virtue of the presence of a grade 4 adenocarcinoma within the tumor

A teratoma is an encapsulated cystic or solid tumor in which more than one germ layer is represented and therefore more complex structures are found in it such as bone cartilage muscle teeth (Plate 49) nerve tissue fat and intestinal mucosa The cyst may be lined with squamous cuboidal ciliated or cylindric epithelium

Pathogenesis—Various theories of the origin of teratomas have been proposed such as that they arise from remnants of neuren teric canal or from remnants of the postanal gut as suggested by Middeldorpf or that they have a bigerminal or a mono germinal origin

Prognosis and Treatment—Although these tumors are encap sulated and complete surgical removal of them is theoretically possible complete removal is seldom accomplished because of their size secondary infection extension and damage to adjacent structures The prognosis in general is not good and the tendency toward recurrence is great In five of our seven cases the prognosis was considered good Treatment is surgical removal with or without subsequent roentgen or radium therapy

Differential Diagnosis—It should be kept in mind that this type of tumor is most often seen in infants and the newborn (five of seven cases in our series) It rarely occurs in adult persons It may rupture discharging bone or teeth Digital and *proctoscopic examination* may show protruding tooth or bone *Roentgenologic* examination may reveal extensive pressure deformity of the sacrum as well as calcification in the tumor According to Camp and Good a teratoma can be distinguished from spina bifida and meningocele by roentgenologic evidence of decalcification of eroded bone while separation of the lamina is clearly defined in cases of spina bifida and meningocele

Dermoid Cysts—Presacral dermoid cysts are not so uncommon as is generally supposed Although we found only five cases indexed in the group of presacral or retrorectal masses there were an additional seven cases during the same period in which the preoperative diagnosis was internal abscesses or fistulas but in which the lesions proved to be small infected dermoid cysts These were removed by an intrarectal or extrarectal approach We have not included these seven cases in our study In this type of case there may be repeated operations without cure for perianal draining sinuses until finally the long-continued infection plus the operative procedures result in anal incontinence Therefore in the consideration of the etiologic basis for so-called recurrent fistula as well as for any retrorectal inflammatory process the possibility of an infected dermoid cyst should be taken into account Dermoid cysts in this region give rise to symptoms as a rule only after they become infected and an occasional finding on routine digital examination of the rectum is a small soft symmetrical cystlike mass in the anterior sacrococcygeal region It is our opinion that noninfected dermoid cysts should be removed by an extrarectal approach (Plate 72) The lesions in our five cases were large infected dermoid cysts three of which were in females and two in males One of them was diagnosed by tissue section as an epidermoid cyst The ages of the patients ranged from five to twenty three years

Pathogenesis—The cause of this type of lesion is a faulty inclusion of ectoderm when the embryo coalesces The lesion may arise from Luschka s gland (coccygeal body) It may be

unilocular or multilocular and some authors believe that it arises from remnants of the neurenteric canal

Prognosis and Treatment—As to life of the patient the prognosis is good but long-continued infection and repeated surgical episodes may result in anal incontinence Recurrence is fairly common because of the residual cyst wall Treatment consists of surgical removal If all the cyst cannot be removed it may be well to apply radium

Differential Diagnosis—This is concerned principally with anorectal fistula Also in any retrorectal inflammatory process the possibility of an infected dermoid cyst should be considered If hair is extruded from a ruptured cyst the diagnosis can be made with certainty *Proctoscopic* examination and the probing of sinuses may be of some value in distinction *Roentgenologic* studies of the bony region may show some pressure erosion of the anterior part of the sacrum

Meningocele—This lesion was present in six patients the lesion represented 7 per cent of the congenital tumors There were five female patients and one male and the ages varied from birth to fifty two years In three of the six cases the lesion extended into the retrosacral region and in three it extended into the presacral region All patients survived operation and three concerning whom follow up data were available were alive and well seven six and four years later respectively

Meningocele is a relatively rare retrorectal tumor As the name implies the lesion is a herniation of the meninges through a defect in the sacrum resulting from a failure of fusion of the laminas In treating this type of lesion the neurosurgeon attempts to ligate the sac as high as possible In the preoperative diagnosis roentgenologic study furnishes the greatest assistance by showing a defect in the sacrum and separation of the laminas In one of our cases digital and proctoscopic examination disclosed a retrorectal cystic mass situated high up on the posterior wall with overlying normal mucosa

Neurogenic Tumors—Several types of tumors that occur in the retrorectal region have a genesis in nerve tissue There were twelve such tumors in the group of eighty two determinate retrorectal lesions (15 per cent) Five were neurofibromas six

were ependymomas and one was a neurilemmoma This group of lesions should be dealt with by the neurologist and neurosurgeon but since they do enter into the problem of differential diagnosis we have included them in our study

Neurofibroma—Of the five neurofibromas three occurred in men and two in women The ages of the patients ranged from twenty one to fifty one years Two of the tumors represented recurrence after previous operation A neurofibroma is a benign tumor which may arise from any of the spinal nerve roots and frequently it is asymptomatic On digital examination of the rectum a firm mass of variable size and location and usually of irregular shape may be palpated It is most likely to be unilateral and located high on the posterior rectal wall with overlying normal mucosa From a roentgenologic standpoint it is a member of the group of tumors that arise within the sacral canal as they grow they produce erosion of the canal or if they extend along nerve roots they may produce erosion of sacral foramina Although frequently they are asymptomatic they may cause pain that extends along nerve roots with dysfunction of the rectum and bladder The treatment is removal but complete removal is sometimes difficult or impossible and therefore recurrences are not rare The prognosis is good if the tumor is completely removed

Ependymomas—Of the six ependymomas which represented 7 per cent of all determinate lesions four occurred in males and two in females The ages of the patients ranged from three months to fifty seven years Five ependymomas were considered malignant by virtue of histopathologic characteristics and the clinical course One was benign and the patient was alive and well twelve years after operation These tumors arise from the cauda equina The symptom of pain is outstanding and is referable to nerve root irritation producing rectal and vesical dysfunction The neurosurgeon can rarely accomplish complete extirpation and consequently the prognosis is not good

Neurolemmoma—This rare tumor occurred only once in our group The patient was a forty-one year-old man who for 11 years had had a dull ache and tenderness in the lower part of the back A large presacral tumor could be palpated There was

no roentgenologic evidence of its presence The tumor was completely removed and the prognosis was good

Osseous Tumors—Exclusive of the patients with chordoma which we have considered in the section on congenital tumors there were only five (6 per cent) with tumors arising from the bony sacrum and presenting as retrorectal masses

Osteogenic Sarcoma—This tumor afflicted two of the five patients who had osseous tumors Both tumors occurred in females aged eleven and twenty three years respectively these ages correspond to those of patients who have this lesion elsewhere in the body The symptoms consisted of pain in the lower part of the back of relatively short duration as compared to the duration of the pain of most other presacral tumors Roentgenographic evidence of bony destruction was the most characteristic feature Biopsy in one case and subtotal resection in the other were followed by radiation The *prognosis* in both instances was poor

Cartilaginous Tumors—The tumors in these two cases were both considered malignant although one was diagnosed as a cellular chondroma One patient was a woman twenty two years old the other was a man fifty years old A definite diagnosis was made by biopsy Surgical removal was impossible and radiation therapy was of no value The prognosis was poor in both cases Local recurrence is usual after removal of such tumors

Miscellaneous Tumors—Fifteen patients (18 per cent) had retrorectal tumors which did not fit into any particular category

Lipoma—The two patients with lipomas were women forty two and fifty three years old A large soft palpable retrorectal mass in each case was not visible on roentgenologic examination One of the patients had two lipomas elsewhere on the body surface a fact which helped in making the diagnosis Both of the retrorectal lipomas were removed surgically and the prognosis was good

Plasma cell Myeloma—In two of the three patients with this lesion the presacral mass was part of a generalized process and in the third so far as we were able to determine it was localized Two men and one woman were affected and the ages ranged

from forty eight to sixty years Biopsy afforded the diagnosis The prognosis was poor

Hemangio endothelioma—Of the two patients with this type of lesion one was a girl three years old and one was a boy fifteen years old Both had roentgenologic evidence of spina bifida occulta and both died

Fibrosarcoma and Leiomyosarcoma—A thirty year-old woman with a retrorectal mass was proved to have a fibrosarcoma and a man aged twenty six and a woman aged fifty-one years were proved to have leiomyosarcomas The prognosis in all three cases was poor

Metastatic Tumors—All the four patients with metastatic tumors in the sacrum that produced presacral masses were men whose ages ranged from nineteen to seventy three years Three of the tumors were metastatic adenocarcinomas and the fourth was a *highly malignant lesion of indeterminate type The primary* source could be determined in only one case in which there was an annular carcinoma of the sigmoid Roentgenologic studies were of the most value in the differential diagnosis

One retrorectal mass had to remain *unclassified* even though tissues at biopsy proved to be malignant The prognosis in the cases of metastatic and unclassified tumors was of course poor

COMMENT

The eighty two *patients with determinate tumors* were about equally distributed between the sexes However certain specific types of tumors had a predilection for sex and age for example *chordomas tended to occur in men* while *teratomas and meningoceles were commoner in female infants and children* than in others For the group as a whole the *chief symptoms were back ache pain in the leg and dysfunction of the bladder and bowel* with *pain in the lower part of the back being the commonest symptom* Other symptoms consisted of rectal pain constipation paresthesias and difficulty in walking Hemorrhoidectomy had been done for five patients during the course of their symptoms from the presacral tumor three of these had chordomas one had a dermoid cyst and one had a neurofibroma

The foregoing again serves to emphasize the importance of

digital and proctoscopic examination digital examination of the rectum is an especially important diagnostic procedure for patients complaining of pain in the lower part of the back In our series proctoscopic examination ruled out the rectum as the site of the primary tumor and in the case of inflammatory and dermoid tumors proctoscopic examination was an aid in the definitive diagnosis

Roentgenologic study of the pelvis probably was the most helpful single diagnostic procedure in the attempt to separate these tumors into three groups namely, (1) *those arising from the sacral canal* the commonest of which was ependymoma which causes erosion of the canal by expansion and pressure the margins of the bone being sharp and well defined (neurofibromas may produce a similar picture) (2) *those arising from the sacral body itself* which were commonly characterized by a picture of expansion of the sacrum by an infiltrative process and (3) *those arising from structures adjacent to the sacrum* such as the teratoma that produces a picture of anterior sacral erosion and appears as an extrinsic mass which may contain teeth or bone

However *in most instances a definitive diagnosis could be made only after histopathologic study of tissue obtained at operation or by transrectal needle biopsy* Patients who have retrorectal masses should be questioned about previous injection treatments for hemorrhoids and in the presence of a recurrent anorectal fistula that has been operated upon often an infected presacral dermoid cyst should be considered a possibility

The prognosis for patients who have inflammatory and congenital tumors, aside from chordomas is good Of the neurogenic tumors the neurofibromas and neurilemmomas respond well to treatment For the patients who had retrorectal tumors the prognosis on the whole was favorable for about 50 per cent and poor for the remainder

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Chapter XVII

THE NATURE OF TRANSANAL BLEEDING IN THE DIFFERENTIAL DIAGNOSIS AS TO THE SOURCE OF THE BLOOD

The passage of blood from the rectum probably is the common est of all rectal signs In the previously referred to 19 581 proctoscopic examinations carried out in 1955 transanal bleeding had occurred within the previous two years in 8 154 patients or 41 6 per cent or almost half of the total group

NATURE OF THE RECTAL BLEEDING

To track down the source of blood passed from the bowel may be one of the most difficult of all clinical problems Un fortunately the history is most unreliable For instance it might well be assumed that bright red blood which drips into the toilet after defecation or blood that is noticed on the toilet tissue used to clean the anal area is in all probability anal in origin Yet on numerous occasions during proctoscopy carried out for such patients I have found a more significant pathologic process such as a polyp or sometimes an early adenocarcinoma situated higher in the bowel which could have contributed to the loss of blood

It is presumed that blood mixed with the stool is coming from a site higher in the bowel than the anal area A history of the passing of clots of blood is suggestive of slow oozing as might be caused by radiation proctitis

BLOOD OR BLOODY MUCUS IN THE SIGMOID

Blood or bloody mucus in the sigmoid or a history of the passage of bloody mucus is very significant In a study carried out by Swartzlander and me fifteen or about 1 per cent of 1 525 patients were reported as having blood mixed with mucus stool

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or water in the bowel at the upper limit which could be visualized at proctoscopy No explanation for the source of the blood could be discovered in the distal part of the bowel examined Subsequent roentgenologic studies of the colon disclosed significant lesions such as polyps or carcinomas situated higher up in the colons of ten of the fifteen patients In the remaining five the bleeding was thought to have been caused by trauma from an enema tip or by the trauma of passing the proctoscope the blood being carried into the sigmoid at the time of the examination with the patient in the inverted position

RECTAL HEMORRHAGE

Just what constitutes a hemorrhage from the rectum in the mind of the patient as well as that of the physician is difficult to describe Obviously it varies greatly Most physicians are aware of the fact that a few drops of blood added to the water in the toilet are enough to make the water red and thus alarm the patient but such a condition certainly is far from a hemorrhage which is considered to be a copious escape of blood possibly requiring transfusion for replacement

When a profuse flow of blood occurs from some lesion of the large intestine an inflammatory component usually is associated which has opened into a large blood vessel Diverticulitis chronic ulcerative colitis a sloughing area after fulguration of a lesion or a slough after injection therapy for hemorrhoids are conditions which might cause a real hemorrhage Polyps carcinomas uncomplicated internal hemorrhoids and the like may cause a flow of blood but not a copious flow

COLOR OF THE BLOOD

The color of the blood that is passed depends on (1) how long it has remained in the bowel and (2) in what part of the intestine it originated According to most gastroenterologists and most papers on the subject blood originating in the upper part of the gastrointestinal tract is supposed to be black (that is the tarry stool) as a result of the action of the various digestive juices on the blood Although that may be true in general *a massive hemorrhage from a peptic ulcer may show up in the lower bowel*

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in the form of moderately fresh blood not necessarily black or tarry

POLYPS AS SOURCES OF BLOOD

Bleeding from small polyps (meaning those up to 1 cm in diameter) is the exception rather than the rule (Plate 46) Larger pedunculated sigmoidal polyps are more likely to be the sources of significant bleeding (Plate 47) than are flat sessile lesions The pedunculated polyp acts as a foreign body and the peristaltic action of the colon tends to move it along and strangle it thus producing bleeding

CARCINOMAS AS SOURCES OF BLOOD

Most carcinomas of the large intestine will produce transanal bleeding In the previously mentioned study carried out by Swartzlander and myself three of thirty eight carcinomas of the lower bowel (8 per cent) did not initiate the passage of any blood This fact plus the above mentioned fact that most small adenomas of the large intestine do not bleed certainly constitute impressive support for those who advocate routine proctoscopic examination of patients in the older age groups

FAMILIAL MULTIPLE POLYPOSIS

Almost all patients who have familial multiple polyposis have bleeding as a sign sooner or later and the passage of blood with the stool is the factor which will first bring them to a physician

THE SITE OF ANASTOMOSIS

The site of an anastomosis may be the source of bleeding if there is much narrowing or deformity of the bowel at that place even though no recurrent malignant process is present

CHRONIC ULCERATIVE COLITIS

Chronic ulcerative colitis and various forms of proctitis will produce blood in the stool at some stage of the disease The frequent bloody discharge of 15 to 20 stools per day in the presence of very active colitis is contrasted with the constipation of the

patient who has early chronic ulcerative colitis In the latter instance the disease is confined to the lower part of the rectum therefore the bowel is not irritable and the result is one stool every day or two with the occasional passage of bloody mucus between stools In this instance again this contrast in the character of the bleeding points up the fact that the history is most unreliable in indicating the source of the blood

RADIATION PROCTITIS

Radiation proctitis almost always will produce transanal bleeding The bleeding may continue for years and the problem of resulting secondary anemia may be a major one but the tendency is always for the process to heal and for the bleeding to lessen The bleeding has the form of slow oozing and is retained for some time in the rectum Hence it has time in which to clot and when blood is passed *it looks like old blood*

LESS FREQUENT CAUSES

Less frequent causes of transanal bleeding seen during the year 1955 were extrinsic lesions such as endometriosis and malignant processes invading through the wall of the bowel During this period four patients with pneumatosis cystoides intestinalis were seen in whom the gas cysts were observed through the proctoscope These patients complained chiefly of rectal bleeding The bleeding came from erosions in the mucosa overlying the cysts Bleeding sometimes is listed as a sign or symptom in the presence of diverticula of the colon I can see how bleeding might occur in patients with diverticulitis in which the inflammatory component might extend into a blood vessel and thus produce bleeding It has long been my feeling that bleeding in the presence of diverticulosis in most instances actually proceeds from an undiagnosed polyp

De Cosse and Amendola reported on forty three patients with diverticulitis of the sigmoid colon all of whom underwent resection of the area of involvement in the sigmoid The operative specimen was accorded careful pathologic study Of the forty three patients 12 or 28 per cent gave a preoperative history of transanal bleeding None had had a massive hemorrhage In six

of the twelve patients the bleeding was accounted for by the finding of a single polyp or multiple polyps in the operative specimen In contrast of the remaining thirty one patients with no history of rectal bleeding two were found to have polyps in the specimen submitted for examination

In the remaining six of the twelve patients with a history of bleeding one subsequently was found to have a duodenal ulcer and one was found to have hemorrhoids and an anal fissure which adequately explained the bleeding In the remaining four cases no source of the bleeding could be found

These authors concluded that transanal bleeding among patients with diverticulitis usually is traceable to other causes principally adenomatous polyps

Although I am in accord with the findings of these authors it is my observation that massive hemorrhage also may occur in patients who have diverticulitis in whom the inflammatory pro cess has eroded through into a good size blood vessel This action takes place in the same manner as the complication of perforation into an adjacent viscus or the peritoneal cavity and this is by no means a rare happening when diverticulitis is present

Most patients who have active amebic infestation of the colon will experience rectal bleeding but there is nothing characteristic about this bleeding that will separate it from other types of bleeding

The ingestion of certain foods such as beets or those contain ing red vegetable dyes may produce a stool that appears to be red and this may cause the patient to be alarmed It is well to keep this possibility in mind Generally however a carefully taken history will be sufficient to dispose of the problem

Transanal bleeding in infancy and childhood may be caused by a great variety of lesions The commonest ones in my experi ence are (1) anal abrasions (2) polyps of the large intestine (3) intussusception and (4) congenital anomalies such as Meckel s diverticulum

The history and proctoscopic examination will determine the source of the transanal bleeding in many patients To localize the origin of the blood in the remaining minority will require gastrointestinal roentgenograms peroral endoscopy and some

times exploratory laparotomy Even when all these measures have been used the source of the bleeding will remain obscure in a few instances

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Chapter XVIII

MEGACOLON

Although the terms megacolon and Hirschsprung's disease have been used interchangeably to include most enlargements of the colon it is generally accepted now that megacolon embraces several distinct clinical entities of various causes

A satisfactory working classification of the various types of megacolon might be as follows

1 Organic megacolon
2 Idiopathic or psychogenic megacolon
3 Congenital megacolon or Hirschsprung's disease

ORGANIC MEGACOLON

Organic megacolon results from some chronic partially obstructing lesion such as a stricture secondary to surgical repair of an imperforate anus or congenital anorectal stenosis It occasionally follows resection of the bowel in which the site of anastomosis is very narrow or it may occur when extrinsic or intrinsic lesions impinge on or constrict the lumen of the bowel That part of the colon proximal to the stricture gradually dilates over a period of months or years Occasionally organic megacolon is seen which is thought to have started as a dolichocolon meaning an abnormally long organ which has an excessive water absorbing capacity The result is that the fecal material becomes dry and hard and therefore difficult to pass Stool accumulates and partially obstructs and the result is said to be a gradual enlargement of the colon

On the other hand it by no means follows that if a patient has a process that constricts the lumen of the bowel megacolon will result As a matter of fact such certainly is the exception rather than the rule Why megacolon should develop in the occasional person and not in another who has a more marked

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stricture is unknown It never ceases to surprise me how well some patients who have undergone resections of the lower bowel for malignant processes seem to maintain themselves with such a small lumen at the site of resection (Plate 18) Furthermore constriction at the site of resection will tend to increase in caliber in time if the patient avoids the use of mineral oil and laxative agents An important factor which must be kept in mind is the dilating action of the stool

Diagnosis—Most of the lesions that will cause organic megacolon occur in the lower bowel and therefore can be visualized with the proctoscope However to determine whether or not that part of the bowel proximal to the site of constriction is dilated usually requires a roentgenogram of the colon Usually a history of symptoms of partial obstruction plus an increase in the size of the abdomen will make the physician suspicious If treatment is indicated it is surgical

PSYCHOGENIC MEGACOLON

This type of functional or idiopathic megacolon is said to originate during the course of a conflict between parent and child No features of this disease are seen in early infancy rather symptoms appear only after neuromuscular development is sufficient to permit voluntary control of the anal sphincter The most common age of the patient at the onset of the condition is between three and nine years According to Carrard and Richmond the process starts from a coercive program of bowel training in about two thirds of the patients That is too much emphasis is placed on the supposed necessity for regulation of the bowels Fecal soiling is the most common complaint at digital examination the rectum generally is found to be packed with feces

Distinguishing Features—The distinguishing features between psychogenic and congenital megacolon as outlined by Carrard and Richmond are satisfactory I have however added the sixth feature in the following list

Psychogenic Megacolon	Congenital Megacolon
1 *Admission complaint* Fecal soiling	1 Constipation without fecal soiling
2 *Age of onset* 2nd year or later	2 Birth or first year of life
3 *History* of coercive bowel training Defecation in standing or supine position Periodic voluminous stool	3 No coercive bowel training Toilet training usually successful Use of toilet for defecation Pelletlike or ribbon stools
4 *Past history* No episodes of intestinal obstruction	4 Frequent episodes of intestinal obstruction
5 *Physical examination* Rectum full of feces	5 Rectum usually free of feces
6 *Proctoscopy* Caliber of rectum and sigmoid larger than normal Mucosa tends to be dry with little mucus secreted	6 Usually caliber of rectum normal up to rectosigmoid area then marked dilatation Rectal mucosa seems moist and appears normal
7 *Fluoroscopy* Absence of spastic segment of rectum or rectosigmoid	7 Presence of spastic segment usually located in upper rectum or rectosigmoid
8 *Course* Negligible mortality rate	8 High mortality rate if untreated

The differential diagnosis between the two conditions is not difficult if the foregoing features are kept in mind Proctoscopy can be a simple diagnostic method of separating the two conditions Surgical treatment is contraindicated in psychogenic megacolon The management of it is psychotherapeutic for both the child and the parents

CONGENITAL MEGACOLON

Synonyms —Other terms for congenital megacolon are Hirschsprung s disease aganglionic megacolon and neurogenic megacolon In recent years the works of Bodian Whitehouse and Kernohan Hiatt Swenson [6] and others have paved the way to the universal recognition of the pathogenesis of this disease entity A definitive therapeutic approach has been accomplished by Swenson and now surgery has much to offer the infants and children thus afflicted

Gross Appearance —Grossly there is a narrowing of a segment of bowel which in 90 per cent of cases is short and is located in the rectosigmoid or upper part of the rectum In the other 10

per cent of cases the narrowed segment is long very occasionally involving the entire colon Proximal to the narrowed segment the colon is tremendously dilated sometimes to as much as six or seven inches in diameter The wall of the bowel is thickened sometimes up to ¼ inch as a result of muscular hypertrophy Haustrations are absent Occasionally there is an erosion type of ulceration of the mucosa brought about by the fecal masses

Proctoscopic Examination —Examination of these infants and children with the proctoscope may demonstrate all the foregoing features The most common error in proctoscopy is the examiner's report that the lower bowel is normal which in effect it is grossly but the narrowed or spastic rectosigmoid with a dilated sigmoid above it will be very manifest if this possibility is kept in mind

Roentgen ray Examination —Roentgenograms are valuable diagnostic aids A flat roentgenogram of the abdomen should be made first It will show the dilated colon containing a large volume of gas and fecal material If a barium enema is used precautions should be taken for removal of the barium as soon as possible Neuhauser and associates have described a technic of roentgen ray examination for demonstration of the narrowed segment or so-called spastic area in these patients A small catheter is inserted just beyond the anal sphincter while the patient is placed in an oblique left decubitus position Barium is slowly introduced under fluoroscopic guidance and the rectum and the area of the rectosigmoid are examined for the quality of normal caliber As the dilated sigmoid is filled the peristaltic waves in that structure may be noted to stop abruptly at the rectosigmoid In the newborn and in infants a few weeks old dilatation of the colon and other changes have not had time in which to take place but a postevacuation roentgenogram which shows that most of the barium has been retained should make the examiner suspicious

Histologic Examination —Histologic study of the constricted segment shows that the parasympathetic ganglion cells are absent whereas they are present in the dilated portion of bowel Although as early as 1901 Tittel noted scantiness and degenerative changes in ganglion cells of the myenteric plexus of the large

intestine in the presence of megacolon and concluded that the normal progression of peristalsis might be influenced unfavorably by this neurologic abnormality it has been only in the last decade that this neurologic deficit was ascribed as the cause of the disease

Obstruction is explained by the fact that the deficient segment cannot carry out normal propulsive peristaltic waves Nonpropulsive mass contraction occurs instead thus creating a mechanical block

The cause of these nerve-cell changes is unknown Raia has conjectured that in the acquired form of megacolon degeneration of the ganglia may be the result of deficiency of vitamin B

Clinical Manifestations—*Males are affected nine times more frequently than females,* cases of a familial incidence of megacolon have been reported As said previously symptoms of congenital megacolon invariably begin at birth or early in infancy *If the symptoms start in childhood later than the second year of life there is a strong likelihood that the megacolon has some other cause* The symptoms take the form of progressive obstinate constipation Abdominal distention is noted early in infancy and it is gradually progressive with accumulation of feces and gas in the bowel The abdominal wall is thin and the superficial veins are prominent Despite the distention abdominal pain and discomfort are minimal or absent

Treatment—Treatment depends on the severity of the disease *Mild Hirschsprung s disease can be managed medically* by diet mild laxative agents the occasional use of enemas and parasympathetic stimulants such as acetylbetamethylcholine bromide (mecholyl bromide) For children who have this disease and survive the first four or five years of life the prognosis is fairly good There is universal agreement that removal of the aganglionic segment by the pull through abdominoperineal method introduced by Swenson is the operation of choice in properly selected cases

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Chapter XIX

RECTAL PROLAPSE

In general the management of rectal prolapse is a surgical problem the technical aspects of which are beyond the scope of this work From a clinical standpoint it is important to settle certain questions

First is rectal prolapse in an infant or child likely to regress as the patient develops?

Second, what types of prolapse are amenable to repair by (1) some intra abdominal surgical procedure (2) some procedure done from below by the anorectal approach or (3) some pro cedure carried out both from above and below?

Third, are any medical or conservative measures effective if surgical treatment is contraindicated?

Before answering these questions we shall review briefly certain facts in respect to definition incidence classification causation symptoms and diagnosis

DEFINITION

By definition rectal prolapse consists of a downward displace ment of one or more coats of the rectal wall which may or may not project externally through the anus

INCIDENCE

Rectal prolapse is more common among infants and children and the aged than among others When the condition develops in children in most cases it does so between the ages of one year and three years *Actually in 60 per cent of all cases the condition occurs at some time in the first three years of life* This figure would vary considerably depending on where the study was made Females outnumber males by as much as six to one in some studies This is probably related to the larger pelvic outlet

in the female plus the strain on the rectal supports that occurs consequent to childbearing

CLASSIFICATION

A classification which seems adequate and workable is as follows

Partial Prolapse —The prolapsed structures are composed of mucosa alone or mucosa and redundant anal skin with or without a variable amount of hemorrhoidal tissue As a rule this type of prolapse is amenable to surgical care of some type carried out from below, such as excision of the redundant prolapsing mucosa anal skin and hemorrhoids Any attempt at intra abdominal *repair obviously is of no help since there is no muscle* involvement (Fig 45*a*)

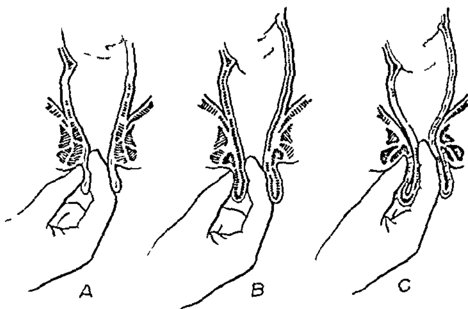


Fig 45 *a* Partial prolapse (no muscle involvement) *b* *Complete prolapse first degree* (*anal and rectal wall with muscle prolapses*) *c* Complete prolapse second degree (anus remains intact) Rectum with muscle and peritoneum intussuscepts through anus (See Plates 58 and 59)

Complete Prolapse —In this type of prolapse all coats of the wall of the bowel are involved

First Degree —The anal *walls are completely* everted with the lower rectal wall (Plate 58 Fig 45*b*) In Plate 58 it will be seen

that the everted anal skin continues without any interruption with the rectal mucosa

Second Degree —The anal wall remains in normal relationship while the rectal wall intussuscepts or evaginates through it In this type of prolapse a sulcus is evident between an anal verge and the rectal wall protruding through it (Plate 59 Fig 45c)

Both first-degree prolapse and second-degree prolapse usually require some type of intra abdominal repair

Invisible Prolapse —Thus far this classification is the same as that of Buie on visible rectal prolapse It would seem reason able that what he and many other authors describe as an *invisible or concealed rectal prolapse* should occur but never having seen it and never having made such a diagnosis I do not propose to include it in this classification If invisible prolapse does occur I would not know how to diagnose it Those who write about it say that proctoscopy of the patient who has it must be carried out with the patient in a semierect position to prevent spontan eous reduction Actually a certain degree of descent of the recto-sigmoid at the time of straining at stool is perfectly normal

CAUSATION

The cause of rectal prolapse rests upon several factors In infants the absence of the sacral curve and the loose fixation of the tissues about the rectum no doubt are factors Debilitating diseases loss of weight and absorption of perirectal fat seem to favor the development of rectal prolapse Weak pelvic muscula ture an elongated mesosigmoid and a low lying cul de sac of Douglas or rectovesical space are thought to predispose to the condition

It would seem reasonable to regard first degree complete pro lapse and second degree complete prolapse as types of herniation through the pelvic diaphragm

Extrinsic mechanical causes such as pregnancy and parturition and adjacent pelvic tumors might be factors in initiating the condition

SYMPTOMS

The symptoms will vary considerably depending on the in

dividual Surprisingly enough a patient sometimes is seen who has had complete rectal prolapse for twenty or more years but who has never considered the condition to be a nuisance sufficient to warrant medical assistance

A history of protrusion at stool is related by the patient or by a parent of the infant As a rule the onset is insidious and the mass recedes spontaneously but later since the condition usually is progressive, manual replacement frequently becomes necessary Eventually as the supporting structures become weaker the rectum turns inside out on any straining-down exertion such as coughing sneezing or crying As a result of the trauma of attempted replacements of the prolapsed structures and the friction generated as the velvety mucosa rubs on the clothing or gluteal skin bleeding and a variable amount of proctitis develop Pain as a rule is minimal but some adult patients complain of backache a sensation of aching that extends down the legs or a feeling of fullness or a heavy sensation Since moisture is more or less constantly present in the area some patients with rectal prolapse will have macerated or excoriated perianal skin

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS

When the patients are infants and children it is usually necessary to accept the parent s description of the condition or to administer a glycerin suppository or an enema to produce defecation so that the nature of the prolapse can be observed

Proctoscopy — At proctoscopic examination of patients who have partial rectal prolapse (meaning mucosa and anal skin) nothing unusual is noted The tone of the anal muscles is good The patient is then asked to strain down while seated on the commode when this is done folds are seen to radiate peripherally from the center of the lumen in contradistinction to the concentrically arranged folds which develop during this maneuver in the presence of complete rectal prolapse

Since the treatment of partial rectal prolapse and that of complete rectal prolapse are very different surgically it is important clinically to distinguish between the two conditions Probably the biggest aid to such distinction is digital or bidigital examination conducted at a time when the prolapse is visible and the

patient is in a squatting position When partial rectal prolapse is present the examiner would be palpating only two thicknesses of mucous membrane between the thumb and index finger (Fig 45a) and the anorectal musculature would be in good position and would have good tone In the presence of partial prolapse even when it is accompanied by the extrusion of considerable hemorrhoidal tissue (as it usually is in adult persons) the length of the prolapsed structures rarely exceeds 2 inches Usually a sulcus can be palpated between the intact anal wall and the everted anal skin

On the other hand when first-degree complete prolapse is present (Fig 45b) (1) this sulcus cannot be palpated (2) generally the prolapse is much more extensive (3) circular or concentric folds are present and (4) during bidigital examination the mass between the fingers imparts the sensation of being much thicker because the examiner is palpating full thicknesses of rectal wall as is not the case when partial prolapse is at hand

In the presence of second-degree complete prolapse (Fig 45c) the anal structures remain in normal position and a sulcus can be palpated surrounding the prolapse where the prolapsed parts intussuscept through the anus This type of prolapse is the largest of all and it is most likely to have a peritoneal sac

When complete rectal prolapse both first and second degree has taken place the tone of the anal musculature is poor With the patient inverted and the prolapsed parts restored the anus may remain patulous with radiating skin folds extending outward The patient can voluntarily close the anus when the anal musculature is palpated between the thumb and index finger the sphincters seem to be poorly developed

PROGNOSIS OF RECTAL PROLAPSE

If definitive surgical treatment is not carried out for rectal prolapse in childhood the parent will be interested in knowing whether or not the child will outgrow the prolapse so to speak To arrive at an answer to this question the records were studied of sixty nine patients less than fifteen years of age who had rectal prolapse[*] Prolapse in this series had started when the children were three years old or less in fifty three of the sixty nine

cases and in the remaining sixteen cases prolapse had developed after the age of three years and before the age of sixteen years

In this study we found that prolapse of the rectum in childhood frequently was associated with other signs of constitutional inadequacy For instance eight of the sixty nine children also had exstrophy of the bladder another eight were mentally retarded seven had malnutrition and others had congenital heart disease inguinal hernia and so on

TREATMENT

Almost all these children were treated conservatively except in a few cases in which the prolapse was very marked *Conservative treatment* consisted of dietary management the use of mild laxative agents reduction of the prolapsed parts soon after defecation and strapping of the buttocks The parents were reassured that there was a fairly good chance the child would recover from the difficulty

Satisfactory follow up data could be obtained in only forty of the sixty nine cases Only those patients whose condition could be followed for more than two years were included The information was obtained by various methods such as questionnaires or subsequent examination

Twenty five of the patients who were between six months and three years old at the outset of the rectal prolapse were treated conservatively After variable periods the prolapse regressed This spontaneous remission usually occurred when a child was about six years old Once the condition regressed in this manner we did not find any evidence that it recurred later in life

In five of the forty cases the prolapse persisted until the patients were seventeen years old or more so that it may be assumed that in at least 10 per cent of cases prolapse of the rectum will continue to be present in adulthood

The other ten patients received some type of therapy while they were still children such as linear cauterization injection therapy or some type of intra abdominal fixation procedure Therefore we do not know what the end results were for members of that group

From a prognostic standpoint, it can be said that the great

majority of infants who acquire rectal prolapse between the ages of six months and three years will recover spontaneously or can be helped by conservative measures If the prolapse is present at birth or shortly thereafter (meaning up to six months) it is more likely to be of the congenital complete second degree type and probably will require intrapelvic surgical treatment at some time

Practical Measures—In infancy and childhood the most important feature is to try to establish the same time for the bowel movement to take place each day At the beginning this may have to be promoted by the use of a small plain warm water enema or glycerin suppository The parent should be shown how to reduce the prolapse immediately after the bowel movement With the child lying on his side gentle pressure over the protruding mass with a soft warm moistened cloth will reduce the mass if the child is not crying or straining Should there be the problem of the reoccurrence of prolapse during the day such as sometimes happens after coughing or crying then the buttocks should be strapped with adhesive tape

Nonsurgical measures do not offer much to adult persons affected by rectal prolapse It has always been my feeling that a systematic plan for the exercising of the anal musculature is worth while (see Chapter XX) not from the standpoint of curing the prolapse but in the fact that if the anal musculature is strengthened the rectum is less likely to prolapse except at defecation Then too anal incontinence of varying degree usually is a factor when complete prolapse is present

Very often in the teaching of methods of treatment for patients with rectal prolapse it is said that they should take mineral oil to keep the stool soft and thus obviate straining In my experience this is wrong because the use of mineral oil favors incomplete evacuation and because variable degrees of incontinence usually coexist Hence there are constant soiling and leakage of stool It is far better for most of these persons to use one of the preparations which augment the bulk of the stools possibly supplemented with a plain water enema manual replacement of the prolapsed mass after defecation and if necessary the wearing of a T binder to obviate recurrence of prolapse Many adult patients learn that if they exert pressure with the fingers inside

the ischial tuberosities during defecation the rectum will not protrude

There are however several conservative surgical procedures which have merit in the treatment of rectal prolapse among elderly patients who might constitute poor risks

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Chapter XX

ANORECTAL CONTINENCE AND INCONTINENCE AND THE NONSURGICAL MANAGEMENT OF THE INCONTINENT PATIENT

To understand why some patients have anal incontinence, it is important to have a knowledge of the mechanism which maintains continence. In other words, why does one patient with a seemingly good sphincter mechanism complain so bitterly of anal incontinence that he has ostracized himself from society? And why does another patient with a gaping, deformed anus, who from an objective standpoint should be completely incontinent, seem to manage himself rather well?

MUSCULAR MECHANISM OF CONTINENCE

In recent years the maintenance of anal or rectal continence has been credited to the external sphincter muscle or, if the puborectalis muscle was described, to both of these muscles.[5] The internal sphincter muscle probably does not function as a sphincter, contrary to the old concept. As Denny-Brown and Robertson and Gaston[3] have shown, the internal sphincter muscle relaxes when the musculature of the rectum contracts and thus actually expedites defecation.

It is a fallacy to assume that tonic sustained contraction of the external sphincter muscle maintains continence for a longer period than a minute or two, except perhaps in periods of stress. Actually, it is impossible to maintain prolonged contraction of this muscle. Contraction is maximal within a few seconds and, according to Gaston,[4] subsides within about a minute.

Proctologists are well aware that surgical division of the superficial and sometimes even the deep portions of the external

anal sphincter muscle does not affect voluntary anal control except for perhaps the first few weeks after the operation They have also observed patients with extensive long standing fistulas who are completely incontinent so far as the voluntary muscles are concerned This is explained by the fact that the long standing infection and recurring abscesses have created much scar tissue that has immobilized the voluntary muscles

NEUROMUSCULAR MECHANISM OF ANAL CONTINENCE

Gaston[4] described two mechanisms involved in what we might speak of as anal and bowel continence (1) *a reflex involving the rectum and external anal sphincter,* and (2) *a reservoir continence in the descending colon*

Reflex Involving Rectum and External Sphincter —Generally *the external anal sphincter is relaxed but peristaltic pressure in* the rectum causes the external anal sphincter to contract reflexively in a few seconds or until the reflex peristaltic pressure ceases This reflex contracture of the external sphincter is initiated by pressure in the rectum and not in the anal canal This explains in part at least the disappointing results of the pull through surgical procedures when the rectum is removed and the anal sphincters are preserved with the objective of maintaining continence Gaston[4] wrote that the afferent impulse of the reflex *is maintained only when the distal* one fourth of the rectum is preserved In my experience most patients who have undergone resection of the rectum and a pull through sphincter preserving procedure have some degree of incontinence *Even though the external sphincter mechanism functions very well voluntarily it is not efficient because the reflex mechanism has been destroyed*

Reservoir Continence of Descending Colon — The second neuromuscular mechanism is called bowel or reservoir continence and is said to reside in all parts of the descending colon The left side of the colon acts as a reservoir independent of the sphincteric action and probably is mistaken for that action I believe this explains the condition of some patients who from an objective standpoint would seem *to be completely incontinent* but who nevertheless manage themselves very well It also explains why

most left sided colonic stomas are easily managed and why many patients who have them seem to obtain a fair degree of continence

ANAL INCONTINENCE

Whether or not anal incontinence develops in a given patient let us say after fistulectomy or some other anorectal surgical procedure usually depends upon more than one factor Frequently it can be predicted preoperatively which person may have a variable degree of postoperative incontinence When some functional disturbance of the colon is present such as the irritable bowel syndrome in which the patient has erratic bowel habits featured by alternating periods of constipation and diarrhea a degree of incontinence is possible after a relatively simple fistulectomy The same is true of patients who have any organic disease of the colon in which diarrhea is a symptom because bowel or reservoir continence is reduced or absent

The causes of anal incontinence are many and the degree is variable A satisfactory classification would have these three headings (1) *traumatic* (2) *congenital* and (3) *acquired* (non traumatic)

Traumatic—Traumatic causes are numerous but at least half of all patients who have traumatic anorectal incontinence date their difficulties first of all to some *anorectal surgical procedure* Fewer patients with anorectal incontinence are being seen now because long-continued packing after fistulectomy or fistulotomy are being seen now because long-continued packing of the wound is no longer favored A greater number of patients who have anal incontinence are being seen after they have undergone pull through procedures for cancer of the rectum because that operation has gained favor during the past decade Some patients have a variable degree of anal incontinence usually manifested as leakage of mucus or inability to retain gas after radical hemorrhoidectomy or local excision of prolapsed rectal mucosa

Other traumatic causes less frequently seen are *lacerations from falls* impalement or traumatic injuries to the head or spinal cord involving the central nervous system *Third degree perineal laceration resulting from childbirth* can be a cause of rectal pro

various surgical procedures for anorectal incontinence in general in my opinion the results of surgical treatment are disappointing The mere fact that at least two dozen operative procedures have been described and carried out among these unfortunate persons indicates that none is very satisfactory I have in mind of course those patients whose incontinence rests upon a local rather than a central nervous system factor Surgical procedures which decrease the size of the anal canal or which involve excision of a scarred sulcus (such as results from a deep fistulectomy wound) and then pulling the denuded surfaces together will be of some help Excision of a mucosal ectropion such as follows a Whitehead operation will reduce leakage and moisture in the area The Thiersch operation done for elderly persons who have prolapsed mucosa is of value *If surgical treatment is considered it must be individualized* A guarded prognosis should be given particularly if the patient has an irritable bowel and if he is of a nervous temperament

Much can be accomplished by means of medical management of these patients frequently medical management should be part of the postoperative care The medical management can be divided into (1) *dietary* (2) *drug therapy,* (3) *irrigations of the lower bowel* (4) *exercises of the anal musculature* and (5) *psychotherapy* These can be used singly or in combination as the individual s particular problem indicates

Dietary —The diet is of a low residue type and should be as simple as possible to follow We have found that it is convenient to instruct these patients by giving them a list of foods that may be included in the diet and a list of those to be excluded Most patients will have some knowledge as to what foods or liquids tend to produce loose stools and these foods of course must be omitted from the list To start with the patient s intake of fluid should be limited A sample of a minimal residue type of diet is shown in Table II

Drug Therapy —This consists of the use of (1) drugs which will decrease intestinal peristalsis and (2) drugs which tend to soak up water from the intestine thus giving more form to the stool

There are many satisfactory preparations on the market which

TABLE II
Foods Included and Excluded in Minimal-residue Diet

Food	Included	Excluded
Beverage	Carbonated beverage, cereal beverage, coffee, tea	Milk, milk drinks
Bread	White or fine rye bread, toasted, with emphasis on enriched; saltines, soda crackers, rusk	Bread or crackers containing whole-grain flour or bran; quick breads
Cereal	Cooked refined corn, rice and wheat cereal; strained oatmeal; commercially prepared cereals from corn or rice free from outer coating	Whole-grain cereals
Dessert	Cakes, cookies, custards, gelatin desserts, ice cream, puddings, rennet desserts, sherbets, all without fruit or nuts	Any other
Fat	Butter, cream, fortified margarine	None
Fruit	Strained fruit juice, including 1 citrus fruit juice daily	Any other
Meat, egg or cheese	Bacon, tender meat, fish and fowl, except those listed under "Excluded"; canned fish, eggs, cottage or cream cheese; Cheddar (American) cheese used only as flavoring in cooking	Fried meat, fish or fowl, fresh pork, cheese other than listed under "Included"
Potato or substitute	Macaroni, noodles, refined rice, spaghetti	Potato, hominy, whole-grain rice
Soup	Bouillon, broth	Any other
Sweets	Candy except that listed under "Excluded"; honey, jelly, molasses, syrups, sugar	Candy containing fruit or nuts; jam, marmalade
Vegetable	Tomato juice	Any other
Miscellaneous	Gravy, herbs except garlic, salt, spices, vinegar, white sauce	Garlic, nuts, olives, pickles, popcorn, relishes

While the patient is following a minimal-residue diet, one complete vitamin preparation should be taken daily.

will help to decrease intestinal motility. We have found that a tablet which contains ¼ of a grain of phenobarbital combined with 1/250 grain of the alkaloids of belladonna, known by the proprietary name of "belladenal," has been satisfactory. Usually one half of this tablet taken before each meal is an adequate dose. Drugs such as this are particularly indicated for patients who have an irritable bowel syndrome or who are subject to emotional disturbances which precipitate a bout of diarrhea. Other anti-

cholinergic drugs of proved value are methantheline bromide (banthine) 50 mg administered after each meal or propantheline bromide (pro banthine) 15 mg administered after meals

It might seem inconsistent to administer the so-called bulk preparations to a patient who is following a minimal residue diet but such preparations as 0 5 gm tablets of methylcellulose do have a facility for soaking up water and imparting more form to the stool The dose of such agents must be individualized but three to six tablets taken after each meal with a limited intake of fluids are of value Various preparations of karaya gum now on the market are effective in a similar manner

Many patients who have a traumatic type of anal incontinence associated with episodes of diarrhea of a functional nature respond very well to drug therapy

Irrigations of the Lower Bowel—Frequently we will combine the above measures of diet and drugs with irrigations of the lower bowel when seepage or leakage throughout the day is a problem After the initial bowel movement of the day the patient is instructed to wash out the lower bowel with a plain warm water enema He is advised to fasten a hook on the bath room wall on which the enema can or bag can be hung Instead of the ordinary enema tip a No 18 F catheter is used because it can be inserted higher into the rectum than the usual enema tip and trauma is less likely to follow when the catheter is used frequently Many patients will say that they have difficulty in retaining the water but the simple maneuver of trying to retain the water in itself is beneficial When a large anal defect is present and retention of water is mechanically impossible a Bardex type of rectal bag and catheter can be used instead of the regular No 18 F catheter The patient is shown how to press the distended Bardex bag against the perineum to close the anal defect so that the water can be retained (Fig 6)

For several years the Section of Diagnostic Roentgenology of the Mayo Clinic has used an effective means of ensuring that the colons of incontinent patients will retain barium during roentgen ray studies of that structure A hole is drilled through the center of an inexpensive soft rubber ball about the size of a tennis ball which can be purchased at almost any 5 and

10-cent store The diameter of the hole is that of a No 24 or 26 F catheter The catheter is then pulled through the hole in the ball and is glued in place with rubber cement (Fig 46) It is used in a manner similar to the Bardex bag to produce pressure on the defect so that water can be retained We have prescribed this type of equipment many times for patients with anal deformities and defects who have difficulty in retaining water *The patients have found it to be extremely valuable* If much stool is expelled with the first irrigation or enema the patient is advised to repeat the irrigation or enema a second or even a third time

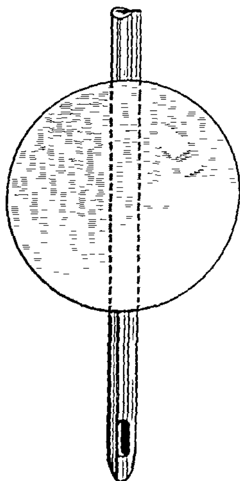


Fig 46 Rubber ball with a No 26 F catheter through it The rubber ball acts as a plug for the incompetent anus See also Figure 6 in Chapter III

Since many of these patients are elderly their first attempt at the procedure should be made under the supervision of a nurse or physician

The irrigation accomplishes two purposes First it rids the lower bowel of stool so that leakage is less likely to occur and the patient will not soil himself so readily Second most of these patients will have a variable amount of scar tissue in the ano-rectal area which tends to immobilize the muscle and make it less efficient The hot irrigation aids in making the scar tissue more resilient and the simple action of attempting to retain the warm water will help to strengthen the muscles in that area

Exercises of the Anal Musculature—A systematic plan for exercising the voluntary anal muscles seems to be of some value for elderly patients or for those who have some degree of incontinence after radical hemorrhoidectomy or fistulectomy The problem is inability to retain gas or mucus with resulting seepage the musculature is present but is weak or inefficient The patient is instructed to do the exercises three times daily each time for five minutes while lying down The external sphincter is contracted and held while the patient counts slowly to five and then relaxes The contraction is repeated The contraction should be vigorous and should be sustained for about five seconds The exercises are continued over a period of two to three months Combining of the exercises with a warm water anal irrigation and irrigation of the lower bowel is a definite help to many of these patients

Some patients do not seem to know how to contract the anal sphincter even though they may have the ability to do so I ask the patient to try to demonstrate such contraction while he or she is on the proctoscopic examining table

Psychotherapy—Patients will vary greatly in their psychic attitude toward incontinence Given two patients with the same degree of anal incontinence one may ostracize himself completely from society while the other may have very little if any concern about the incontinence What is operative probably is the same mental process that takes place in some women who have recto vaginal fistulas Daniels found that about 25 per cent of women with rectovaginal fistulas who would pass gas and sometimes

stool by way of the vagina did not consider these actions to constitute enough of a problem to warrant operative correction As in any other psychotherapeutic procedure careful analysis of the problem is necessary to make reassurance effective Many patients who have anorectal incontinence wear a diaper which is psychologically bad It is well to counsel that such a practice be abandoned after the above-described measures of diet drugs irrigations and so on have been started This counsel should help to restore the patients confidence

Surgical measures do have a place in the management of anal incontinence but the patients to be treated thus should be selected carefully Frequently it is advisable to try medical management of most of these patients before surgical treatment is advised

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Chapter XXI

DIFFERENTIAL DIAGNOSIS IN STRICTURES OF THE ANUS AND RECTUM

It is rather difficult to gain a true picture of the incidence of rectal stricture or to see the etiologic factors in true perspective The main reason for this is that rectal stricture usually is con sidered to be and is reported as a complication under the head ing of many different causes

As indicated in previous chapters strictures of the lower part of the intestine can be produced by extrinsic intramural or intrinsic processes but the basic pathologic change which under lies all rectal strictures except the neoplastic ones is destruction of tissue The normal reaction of the body in the healing of an area of tissue destruction is fibrosis which produces a scar and scarring leads to contraction

CLASSIFICATION

Anorectal strictures generally may be grouped as (1) *neoplastic* (2) *congenital* (3) *inflammatory* and (4) *traumatic*

Neoplastic Strictures —The commonest cause of stricturing of the lower bowel seen at the Mayo Clinic is neoplasm Because this subject has been considered elsewhere in this volume (see Chapter XI) and because of the entirely different type of therapy required we do not propose to discuss it here

Congenital Strictures —Congenital strictures also belong in a different category since the great majority of them are anorectal rings resulting from failure of the fetal anal membrane to com pletely resorb The incidence of this type of anorectal narrowing (called stenosis by Bacon) is surprisingly high but it scarcely ever requires treatment and rarely causes symptoms In a series of 1 716 consecutive infants studied by Harris Corbin and Hill

236 or 13 8 per cent had anorectal rings but none had symptoms The stenosis or narrowing was much more common in female infants than in males by a ratio of 4 to 1 *In my experience congenital anorectal rings or strictures in infants and children are rather common As a rule, they do not require treatment and in the course of time will correct themselves, probably by means of the natural dilating action of the daily passage of a formed stool*

TABLE III

ETIOLOGIC BASES OF 400 NONMALIGNANT AND NONCONGENITAL RECTAL STRICTURES[4]

Cause of Stricture	*Patients*
Chronic ulcerative colitis	1 8
Lymphogranuloma inguinale	61
Followed surgical procedures for rectal carcinoma	[illegible]
Followed radium treatment for carcinoma of cervix	1
Followed fulguration or radium or both for treatment of rectal carcinoma	1[illegible]
Complete or incomplete internal fistula	1[illegible]
Followed injection treatment for hemorrhoids	[illegible]
Inflammatory extrarectal mass	
Tuberculosis	[illegible]
Endometriosis	3
Amebiasis	
Diverticulitis	[illegible]
Traumatic (enema burn)	[illegible]
Unclassified	61
Total	400

Inflammatory Strictures—The records of 400 nonmalignant and noncongenital rectal strictures resulting from a variety of causes as seen at the Mayo Clinic were reviewed by Smith and Hill and were classified on an etiologic basis (Table III)

There is rather general agreement in the literature that the most common cause of inflammatory stricture is lymphogranuloma inguinale (See Chapter XIII) This is probably true even if not substantiated by the data in Table II the reason for the preponderance of chronic ulcerative colitis as an etiologic cause in that table is that we in the Middle West see relatively little lymphogranuloma inguinale

Next to the formation of polyps stricture is the most common complication of chronic ulcerative colitis it is found in about 9 per cent of the patients we see The mechanism of the formation of this stricture has been previously discussed (Plate 23) (See Chapter VII)

Traumatic Strictures—Traumatic strictures are caused by surgical excision or fulguration of rectal cancers or polypoid lesions radium or roentgen ray treatment of carcinoma of the cervix and rectum surgical removal or injection treatment or both of hemorrhoids the use of hot or caustic enemas presence of foreign bodies and occurrence of injuries In the Smith and Hill series twenty two strictures followed surgical operations for cancer of the rectum and twenty-one followed radium treat ment for carcinoma of the cervix

Morphologic Aspects—Morphologically strictures of the lower bowel can be classified as *tubular annular partial* or *complete* About 70 per cent of rectal strictures are located within 5 cm of the anus and more than 90 per cent are within 10 cm of the anus Although it depends on the disease causing the stricture there is usually some dilatation of the bowel above the site of a stricture and sometimes a secondary erosion type of ulcer occurs at the stricture Through the lumen of the stricture and below it there is usually tough dense scar replacing the mucosa

SYMPTOMS

The symptoms of rectal stricture are determined by the under lying disease which is causing the stricture Most patients who have active chronic ulcerative colitis and a stricture will experi ence no indicative symptoms even though the diameter of the lumen at the site of the stricture may be only a few millimeters

In general however in the presence of stricture there are in creasing constipation frequent defecation with urgency and tenesmus mucopurulent and bloody discharge and a decrease in the caliber of the stools Later symptoms may be abdominal distress and distention

PROCTOSCOPY OF PATIENTS WITH STRICTURE

Proctoscopy of patients with anorectal strictures usually can be done clinically but it may be necessary to resort to the use of proctoscopes of smaller caliber if it is considered advisable to examine the bowel above the stricture A maneuver that I have used many times in passing a proctoscope through the site of stricture with a minimum of trauma is as follows After that

part of the bowel distal to the stricture has been examined the proctoscope is brought into line with the lumen through the site of stricture The obturator the rounded smooth end of which projects beyond the end of the proctoscope is reinserted while the proctoscope itself is held steady The proctoscope is then advanced blindly a little at a time while the obturator is withdrawn and reinserted to make sure that the lumen is directly ahead (Fig 47) *If the site of the stricture is above the peritoneal reflection* it is obviously necessary to proceed more cautiously when this maneuver is used *The maneuver should not be used* in the presence of active chronic ulcerative colitis Examination with the patient under the influence of anesthesia sometimes is necessary

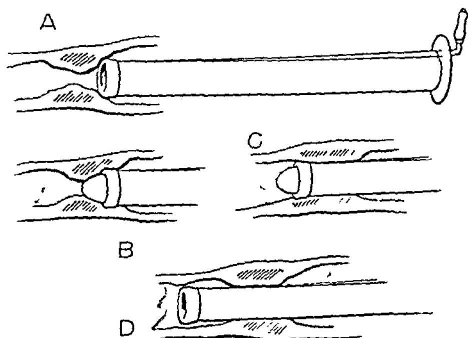


Fig 47 Technic of proctoscopy proximal to a stricture A *The proctoscope* at the site of the stricture B The obturator reinserted into the proctoscope C. Cautious advance of the proctoscope with the obturator acting as a dilator D The proctoscope passes through the site of stricture

DIAGNOSIS

As a rule the diagnosis as to whether or not a stricture is present is rather easy The difficult and important thing is to establish the cause of the stricture because on this depends the nature of the treatment What we wish to know first of all is *Is the process malignant or nonmalignant?* Repeated study of specimens of tissue removed for biopsy may be necessary to do this In addition to a carefully taken history examinations of stools and proctoscopic examination certain special procedures such as the Frei test (see Chapter XIII) will be of further help in identifying the lesion

PREVENTION AND TREATMENT

Proper surgical technic in the conduct of hemorrhoidectomy and resection of the bowel as well as protection of the rectal wall by packing away radium used in the treatment of lesions of the cervix is a preventive measure The type of treatment carried out depends upon the degree of stricture present

Physical Therapeutic Measures—The use of hot retention enemas or hot rectal irrigations in the manner described elsewhere in this text (Chapter XXIII) is of value in washing away infected secretions and in getting rid of stool lodged above the site of stricture Stool thus lodged might subsequently leak out and cause soiling The temperature of the water should be about 105° F the procedure should be carried out after each time the patient has a stool

Digital Dilatations—The use of digital dilatation of most rectal strictures probably is more of psychologic value to the patient and physician than of any real benefit It has been my experience that any effective dilatation of a stricture has to be done with the patient under the influence of anesthesia

Drug Therapy—Drug therapy is of limited value Banov published an encouraging report on the use of the broad spectrum antibiotic agents such as chlortetracycline chloramphenicol oxytetracycline erythromycin and tetracycline He felt that by the use of these agents he was able to improve the condition of thirty four of forty one patients who had rectal strictures caused by lymphogranuloma venereum I have not had any personal experi

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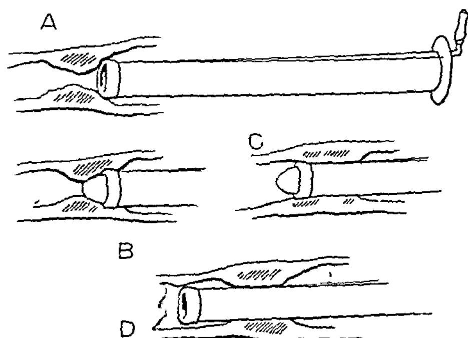


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ence with the use of these antibiotic agents against inflammatory rectal strictures It would seem however that for such agents to be effective there would have to be present a considerable inflammatory component still active It is improbable that the dense tough scar itself of these strictures could be resolved by any drugs

Surgical Procedures—Surgical measures will not be discussed here except to add my repeated observation that *if colostomy is done with the objective of permitting the inflammation to subside or to rest the bowel distal to the colostomy' many inflammatory strictures accorded such treatment will become completely occluded or at least, will become more marked* This has been noted after shunting procedures carried out for strictures resulting from lymphogranuloma inguinale chronic ulcerative colitis irradiation and trauma The dilating effect of the stool as it passes through the stricture is considerable Many patients with marked narrowing of the lumen of the bowel manage themselves very well with minimal symptoms of obstruction by the use of hot rectal irrigations and local hygienic measures This is particularly true of those who have strictures arising from chronic ulcerative colitis Unless symptoms of obstruction are marked or anal incontinence is present or *multiple draining* sinuses with a great inflammatory element are causing difficulties I am opposed to the performance of colostomy in the treatment of strictures of the lower bowel

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Chapter XXII

MALFORMATIONS OF THE TERMINAL PORTION OF BOWEL

Principally for the sake of completeness a summary of pertinent data relative to congenital anomalies of the anus and rectum follows The reader is referred to the excellent work of Gross for a more detailed discussion Since the proper treatment is guided to a large extent by the classifying of malformations in this area into one of four groups the diagnosis and differential diagnosis will be our main concern in this discussion

I readily admit that my experience in dealing with anorectal malformations is limited for the obvious reason that the type of practice carried on at the Mayo Clinic is not that of a great metropolitan center Since about 75 per cent of all congenital anomalies in the anorectal area require emergency surgical treatment to relieve complete obstruction a practice in an area of concentrated population would be necessary for the acquisition of considerable experience in this particular field

Anomalies in the terminal portion of bowel are rather rare meaning that they occur about once in 5 000 newly born babies The distribution according to sex is about equal

CLASSIFICATION

All malformations in the terminal portion of bowel are classed in one of four groups as follows

Type I —Anal or rectal stenosis or both with intestinal continuity (Fig 48) In the 507 cases of anorectal malformations reported by Gross twenty nine of the lesions or about 6 per cent of the total were of this category When this form of stenosis occurs in the anal canal it is presumed to be the result of partial failure of absorption of the anal membrane In a study of Harris and associates of 1 716 consecutive newborn infants an anorectal

ring was found in 13.8 per cent. It was their opinion that the process resolves itself spontaneously in most instances. Gross indicated that manual dilatation of the stenosed process over a long period is indicated but it has been my observation that the natural dilating effect of passage of a formed stool will create an anorectal outlet of normal caliber in the vast majority of cases. *Therefore, surgical treatment is rarely indicated for the type I anomaly.* (See Chapter XXI.)

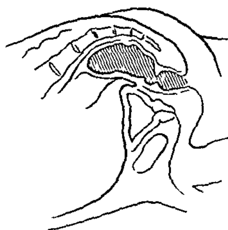


Figure 48

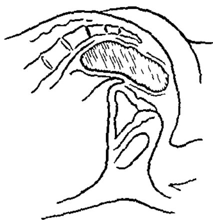


Figure 49

Fig. 48. Type I congenital anorectal malformation. Anal or rectal stenosis with intestinal continuity.

Fig. 49. Type II congenital anorectal malformation. Imperforate anus. The obstruction usually is membranous.

Type II Imperforate Anus.—The obstruction is membranous and a dark discoloration is imparted to the membrane by meconium (Fig. 49). This type of anomaly occurred in fourteen of Gross' 507 cases (3 per cent). All infants who have this malformation are seen within the first few days after birth. Absence of meconium and bowel movement are the only signs for about the first 1½ days. Thereafter progressive symptoms of obstruction develop such as distention, vomiting and so on. The treatment is emergency surgery, the technic of which is beyond the province of this work.

Type III Imperforate Anus.—The rectal pouch ends some distance above the anus (Fig. 50). This anomaly comprised the great majority of the lesions reported by Gross. They numbered

413 or 80 per cent of the 507 cases Most of the patients (80 per cent) have an associated fistula which in the female usually opens into the posterior vaginal wall In the male the fistula generally opens on the anterior part of the perineum or in the scrotum Patients with adequate fistulous tracts through which the stool can be evacuated are seen later in life sometimes when they are adult persons and it is with this type of patient that I have had the most experience If the fistulous tract is too small to permit the passage of stool symptoms of obstruction develop and the problem becomes an emergency similar to that obtaining when a type II anomaly is present

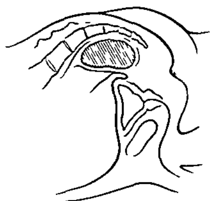


Figure 50

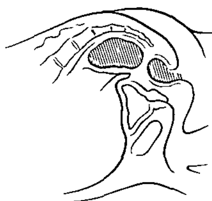


Figure 51

Fig 50 Type III congenital anorectal malformation Imperforate anus The rectal pouch ends a considerable distance above the anus

Fig 51 Type IV congenital anorectal malformation The anus and lower part of the rectum are normal but the rectum ends blindly in the hollow of the sacrum

The physical findings are variable The perineum may have a small ridge or a dimple where the anus should be Since the external anal sphincter muscle develops from the mesenchymal elements in this area and is not dependent upon the presence of the bowel the sphincter generally is present and is fairly well developed regardless of the type of anorectal malformation Pinching the perineum or buttocks may indicate the site of the sphincter Contraction of it beneath the skin may be noted as it imparts a puckering to the surrounding skin

From a diagnostic and therapeutic standpoint it is important to know the location of the rectal pouch A finger placed in the anal area may detect an impulse as the infant strains or cries provided the blind pouch is situated low enough If a fistula is Present probing it will give valuable information as to the location of the pouch

Type IV—The anus and anal pouch are normal but the rectum ends blindly in the hollow of the sacrum (Fig 51) This type of malformation occurred in twenty-one (4 per cent) of the 507 cases Because of the normal anal outlet this particular anomaly is the most dangerous and deceptive Even if the obstetrician is in the habit of doing routine digital examination of the rectum on newly born infants as he should be the atresia can be missed Generally there is a substantial delay in making this diagnosis and the infants are brought in on the third to the fifth days as constituting poor surgical risks as a result of the complete obstruction

ASSOCIATED CONGENITAL ANOMALIES

In 198 (39 per cent) of Cross cases there were associated congenital anomalies such as congenital heart disease or intestinal atresia

ROENTGEN RAY EXAMINATION

Wangensteen and Rice have described a method of determining the position of the blind pouch by making a lateral roentgenogram of the abdomen and pelvis while the infant is inverted (that is with the infant s head down and a lead marker placed at the site of the imperforate anus) It is generally believed that such roentgenograms are not too reliable during the first twenty four hours of the infant s life since the gas in the colon may not have pushed along far enough to outline the distal end of the rectal pouch

ENDOSCOPY

If colostomy already has been done endoscopy of the distal segment of bowel may establish the point of obstruction The insufflation of air or the instillation of some opaque contrast

medium through the stoma into the distal segment of bowel may be needed to establish the level of the rectal pouch.

When a type III anomaly is present, meaning a vaginal, perineal, or scrotal fistula, it is frequently possible to pass a small caliber proctoscope through the fistula and into the rectum and thus obtain information.

Although malformations of the anus and rectum are not common, obstetricians would do well to do routine digital examinations of the anus and rectum in all newly born infants.

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Chapter XXIII

DIFFERENTIAL DIAGNOSIS OF ANORECTAL PAIN AND PHYSICAL THERAPEUTIC MEASURES FOR RELIEF OF PAIN

There are many causes for pain in the anorectal region but as a rule the diagnosis of such pain is not difficult if the usual precautions of a carefully taken history and a well-conducted examination are observed Difficulty does arise however in selecting those patients who might benefit from some surgical procedure and those whom surgical treatment will not help Most laymen and unfortunately a considerable number of physicians seem to be inclined to attribute every discomfort in the nether parts to piles which means that many patients who have functional rectal discomforts are prey for the unwary but particularly for the unscrupulous practitioner

HISTORY

In the taking of the history as is true of taking the history of pain located in any part of the body it is important to ask certain definite questions First *what influences the pain?* Second *where is the pain located?* Third *does the pain extend?* Fourth *what is the nature and duration of the pain?*

Although it is true that a diagnosis can not be made on the basis of the history alone certain characteristics of the pain may be significant

TYPES OF PAIN

Anal Pain—Anal pain is that which is made worse by defecation *It suggests ulceration of the anal canal such as would result* from a fissure abrasion or anal neoplasm

Pain of Anal Fissure—Pain from a true anal fissure lasts from a few minutes to an hour or so after defecation Subsequently there is relief from discomfort until the next movement of the bowel A pain that comes on rather suddenly and is described as dull and aching not aggravated by defecation with swelling around the anus is more suggestive of thrombosed external hemorrhoids

Abscess Pain—Pain from the formation of an abscess usually is described as throbbing It increases progressively in intensity and is aggravated by sitting

It should be remembered that the nerve supply of the rectum is visceral or autonomic and is not subject to the ordinary pain stimuli whereas the nerve supply of the anus is abundantly taken care of by the sensory or somatic system

In the evaluation of pain located any place in the body it is well to keep in mind the fact that a painful lesion produces a different response in different persons because of variations in the tolerance of pain

Rectal Pain—Rectal pain is variously described by patients as a dull aching a feeling of fullness or a pressure type of pain not relieved by bowel movement Generally the patient is unable to localize the pain meaning that he cannot say how far inside it is

Hill discussed rectal pain under two main headings first pain which has definite characteristics a pain which usually is severe and which is considered to be the immediate result of spasm of the intrinsic musculature of the rectum and second heterogenous pain that is vague and of obscure cause

Pain caused by spasm of the rectal musculature such as tenesmus is involved in an ineffectual effort to evacuate the terminal portion of the colon This sort of pain may vary from a mild to an intense and constant desire to evacuate the rectum It is attributable to spasm of the circular muscle of the rectum As a rule an associated inflammatory process is present in the rectal mucosa such as irradiation or chemical proctitis chronic ulcerative colitis or bacillary or amebic dysentery Benign or malignant neoplasms (especially if they are extensive) and impacted feces or foreign bodies are likely to cause spasm or tenesmus Occasion

ally rectal spasm is associated with diverticulitis or with benign rectal stricture if the mucosa is *sufficiently inflamed* *Tenesmus* sometimes may accompany extrinsic processes that invade the rectum such as endometriosis or a malignant process

Proctalgia Fugax —Proctalgia fugax means fleeting rectal pain It is a term coined by Thaysen in 1935 and it accurately describes those paroxysms of high rectal spasmlike pain which last from one minute to fifteen minutes which vary in intensity from mild to agonizing prostration and which occur more frequently at night than during the daytime The condition occurs more frequently among men beyond the age of thirty years and the frequency of the spasmlike episodes will vary greatly from two or three times a year to as often as two or three times a week Some patients will say that they are awakened from a sound sleep by this type of pain and that they have learned that the passing of flatus or defecating or sitting in hot water will give some relief

Most patients will have difficulty in locating the site of the pain a difficulty which of course is characteristic of attempts to describe a visceral type of pain They will describe it as being *one inch to six inches inside the anus* Many of these patients will say that they had been operated upon for infected crypts or piles or for some other type of anal condition without relief

Proctoscopic Examination —From an objective standpoint nothing organic is found at proctoscopic examination Hill wrote that in some of these patients there may be a physical basis for the pain such as some abnormality in the seminal vesicles or prostate gland In my experience most *persons who complain* of this sort of pain are the tense nervous type

Treatment —The treatment is symptomatic I advise patients who have this *condition* to take a hot retention enema as soon as possible after the onset of the spasm The water should be about as warm as the hand will tolerate for a half minute and the amount instilled *into the rectum should* be about a pint or less This affords almost immediate relief Patients who have frequent episodes are advised to have available 1/200 grain tablets of nitroglycerin one of which is placed *under the tongue* as soon

as the attack comes on Sometimes the combination of the nitro glycerin and hot retention enema is indicated

Rectal Crisis—The rectal crisis in the presence of tabes dorsalis and certain tumors of the spinal cord is a spasmlike pain which lasts much longer than does proctalgia fugax When such conditions are present neurologic disturbances are associated

Vague Rectal Pain—There are many organic lesions notably the presacral tumors which will cause a pressure type of rectal aching that extends into the hips and down the legs Large carcinomas of the prostate gland with posterior extension fre quently will cause primary rectal aching and a sensation of full ness rather than genitourinary difficulties Extrarectal masses in the cul-de sac such as endometriosis and malignant implants will engender a variable degree of vague rectal discomfort Many patients complain of vague rectal discomforts for which no organic cause can be found

Coccygodynia—Thiele has described another cause of obscure pain in the rectal region particularly common in women It is characterized by tenderness and discomfort in the region of the coccyx and lower part of the sacrum and the adjacent soft tissues and muscles These symptoms are presumed to be the results of spasm of the levator ani and coccygeus muscles When there is associated pain in the hips and legs it is thought to be caused by spasm of the piriformis muscle Sitting aggravates the pain but the pain is not influenced by defecation Intrarectal digital massage of the involved muscles and hot retention enemas will help some of these persons Generally removal of the coccyx is not beneficial and will seem to aggravate the discomfort in some persons

Pain of Cysts of the Sacral Nerve Roots—In 1953 Tarlov described another cause of sciatic pain or the cauda-equina syn drome that is sacral perineural cysts He said that the develop ment of slowly progressive changes referable to the sacral or coccygeal part of the cauda equina should lead the examiner to suspect these cysts The cysts produce symptoms referable to the sciatic nerve or caudal nerve roots paresthesias of the penis or vagina urinary disturbance and sensory changes over the

buttocks and perineal area Since the cysts occur most commonly on the second sacral nerve root and less frequently on the lower sacral nerve roots and coccygeal nerves it is only logical to assume that in at least some cases vague anorectal pain and severe coccygodynia could be explained by the presence of these cysts Tarlov wrote that clinicians should suspect the possibility of these cysts in cases of sciatic pain in which surgical operation has not revealed a herniated intervertebral disk

NONSURGICAL MANAGEMENT OF ANORECTAL PAIN

Physical Therapeutic Measures—If for some reason surgical treatment is contraindicated or if there is anorectal pain for which no organic explanation can be found certain procedures can be instituted which may be of benefit I do not mean to imply that any of these *physical therapeutic measures* to be discussed take the place of definitive surgical operation

Hot Retention Enemas—Hot retention enemas if properly used frequently will afford considerable symptomatic relief in certain vague rectal discomforts or in inflammatory processes such as infections in or around the anastomosis after low anterior resections for carcinoma of the rectum or postoperatively in extensive internal fistulas or infected presacral dermoid tumors The patient is advised to replace the ordinary enema tip with a No 18 or 20 French catheter to help obviate trauma to the anus or rectum The hot enemas are used twice daily Tap water at a temperature of 105° F is used but in preference to the use of a thermometer to test the temperature the patient is advised that the enema water should be about as warm as the hand will tolerate for about a half minute The amount of water used depends on the amount that the patient can retain with a reasonable degree of comfort it will vary from a half pint to about 1½ pints The patient is advised to retain the water for about five minutes while seated on the toilet After the water is expelled the process is immediately repeated The procedure may be repeated two or three times depending on the condition for which the patient is being treated and the amount of relief the enemas afford him

Hot Sitz Bath—Sometimes the hot retention enema is com

bined with a hot sitz bath The temperature of the water of a hot sitz bath should be about 105 F A bath of this type that lasts for more than fifteen or twenty minutes is very exhausting to the patient In my experience hot retention enemas have a much greater physical therapeutic effect than does the hot sitz bath

Hot Moist Packs—The hot moist pack is of value as a temporizing method in certain painful anal lesions such as thrombosed external hemorrhoids and acute abscesses during the period required for the abscess to develop to a stage where it can be treated One advantage of the hot moist pack over the sitz bath is that the pack can be applied more or less continuously whereas a sitz bath of fifteen or twenty minutes is most exhausting for the patient

The hot moist pack is prepared and applied as follows A roll of gauze is soaked in hot water Excess water is squeezed out with the aid of a potato ricer and after the temperature of the pack has been tested by contact with the back of the hand for a short time the pack is applied to the perineum as indicated in the accompanying diagram (Fig 52) Outside of the applied pack are placed several layers of wet flannel and then the source of heat is applied It may be either a hot water bottle or a rubber insulated electric pad The gauze flannel and source of heat are kept in place with a towel rubber sheet and pillow as depicted in the diagram The gauze and flannel and position of the patient should be changed about every hour Whenever hot packs are used burns are a possibility and should be guarded against

Ice Packs or Cold Wet Packs—Ice packs or cold wet packs seem to provide more relief of painful lesions such as thrombosed external hemorrhoids or a developing abscess than do hot moist packs in certain patients They are applied in the same manner as the moist packs except that ice water and ice chips are used and of course the heat is eliminated

Roentgen ray Therapy—Roentgen irradiation seems to be of some value in certain vague rectal discomforts and in coccygodynia This is particularly true when there might be some inflammatory component in operation A relatively small dose of

120 to 150 roentgens (air dose) is used every other day two or three times [3]

Short wave Diathermy —Short wave diathermy in which an intrarectal electrode is used which contains an alcohol thermometer is of some value against certain vague rectal discomforts in which muscle spasm seems to be involved In this instance again results of the use of the diathermy are more beneficial if an inflammatory component is present Diathermy can be used daily for a week or ten days Each treatment lasts thirty minutes and the temperature should never exceed 105° F [1]

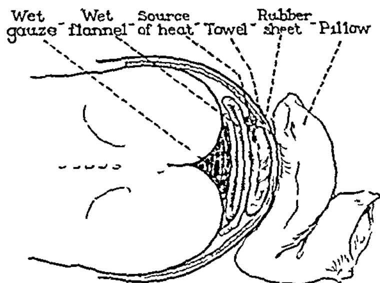


Fig 52 Method of application of hot or cold packs to the anorectal and perineal areas (Reproduced with the permission of the publishers from Jackman R J The Management of Hemorrhoidal Thrombosis *Cl H* 82 86 [July] 1956)

Rectal Suppositories —Rectal suppositories are prescribed by many physicians and used extensively by patients for any and all ailments of the anus and rectum The use of such suppositories certainly is abused yet even though the benefits claimed by patients as resulting from rectal suppositories in many cases seem to be more psychologic than real I do think that rectal suppositories properly used have some value When there is a break in the continuity of the anal skin such as frequently occurs in the presence of chronic ulcerative colitis or when

surgical treatment of some anal lesion might be contraindicated suppositories containing a topical anesthetic agent such as ethyl aminobenzoate do afford temporary relief of pain

The physician should show the patient how to use the suppository When an anal abrasion or an anal fissure is present considerable anal muscle spasm also is associated with it as a rule so that the proper use of suppositories is not simply a matter of insertion into the anus If care is not exercised the muscle spasm will cause the suppository to proceed into the rectum far removed from the site of the pain The patient should be instructed to insert the agent about halfway into the anus holding onto the end of it with a piece of gauze until it starts to soften When softening is noticed the suppository should be pushed in When this maneuver is used the anesthetic agent will reach the affected area Actually the suppository is simpler for the patient to use than an ointment It is well to remember however that some patients are sensitive or become allergic to topical anesthetic agents such as ethyl aminobenzoate

I have never been able to understand the rationale of the use of rectal suppositories which contain systemic pain relieving drugs such as belladonna and opium Since these opiates do not exert any local action it would be much more aesthetic and just as beneficial to take the same drug by mouth

Suppositories which contain antibiotic or bactericidal agents, supposedly indicated in the treatment of certain anorectal infections have had little or no value in my experience If antibiotic agents are indicated for infections in this area they should be given parenterally or orally

The use of glycerin suppositories to promote defecation in infants and children is preferable to the use of laxative or cathartic agents since the latter can lead to the abuse known as the laxative habit I have never seen any harm come from the use of glycerin suppositories and the temporary use of such suppositories in toilet training the infant does have merit Long continued use of them should be discouraged

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Chapter XXIV

PROCTOSCOPY AS AN AID IN THE DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS OF DIVERTICULOSIS AND DIVERTICULITIS

Although the diagnosis of diverticulosis or diverticulitis of the colon is dependent primarily on roentgenologic studies proctoscopic examination is of more value than is generally thought This is particularly true in the differential diagnosis between diverticulitis and carcinoma of the sigmoid The roentgenologists tell us that the filling defect in the presence of diverticulitis of the sigmoid is characteristic in that it is relatively long and somewhat hourglass shaped However this defect may be short and mimic the shadow of a carcinoma whereas the converse also is true It is in such confusing situations that proctoscopy may afford the evidence which will establish the correct diagnosis

FIVE PROCTOSCOPIC SIGNS

In 1939 Buie described *five proctoscopic signs* which may determine or lead to the strong suspicion of the presence of diverticulosis or diverticulitis of the sigmoid

Limited Mobility of Bowel—Limited mobility of a segment of bowel which normally is freely movable should arouse suspicion Obviously there are many factors other than diverticulitis which will cause the lower part of the sigmoid to lack mobility Still when absence of mobility is associated with *one or more* of the other irregularities to be mentioned the factor of immobility does constitute strong supportive evidence of diverticulitis A fixed or retroverted uterus and pelvic inflammatory disease may interfere with or even prevent complete proctoscopic examination but in these instances the examiner must take into consideration the age and the sex of the patient moreover when

such a uterine condition or such pelvic disease is present immobility of the bowel is likely to be lower down than it is when diverticulitis is present If diverticulitis is present little difficulty is experienced in passing the proctoscope until the area of the sigmoid is reached

Angulation of the Bowel—Angulation of the bowel in itself is not diagnostic but is suggestive Combined with immobility and perhaps mucosal edema this deformity is even more corroborative When certain patients are found to have a sharp angulation of the sigmoid it may be possible to gain more information by the use of a proctoscope of smaller caliber than that of the regular instrument

Reduced Caliber of the Lumen of the Bowel—Such a condition is not uncommon among patients who may have had diverticulitis As the inflammatory process subsides fibrosis occurs and the caliber of the lumen of the bowel decreases When active diverticulitis is present it is the rule rather than the exception to find a reduced lumen of the bowel Associated with it are likely to be mucosal edema limited mobility and sometimes fixed folds of mucosa To detect such changes it usually is necessary to use a proctoscope of small caliber because the patient already will be experiencing *considerable* discomfort from the diverticulitis

Sigmoidal Sacculations—Sacculations of the sigmoid are essentially weak places in the muscularis mucosae and often are found at sigmoidoscopy and at the time of postmortem examination in elderly persons Through the proctoscope they appear as shallow pouches which extend partially or wholly around the wall of the bowel Sometimes these pouches or sacs (Plate 50) are deep so much so that they will admit the end of the sigmoidoscope and convey the impression at first of a reduplication of the bowel Sometimes in the depths of one or more of the sacculations a diverticulum is seen Generally sacculations are seen in a mobile sigmoid that has no evidence of inflammation In my opinion the finding of sacculations of the sigmoid is so suggestive of diverticulosis that if I do not see diverticula associated with the condition I advise a roentgenogram of the colon which usually will verify the suspicions I have seen several

instances in which I reported sacculations of the sigmoid in the proctoscopic findings but in which roentgenograms of the colon did not disclose diverticula. Yet roentgenograms of the colon made from one year to three years later did reveal diverticulosis.

Visualizing the Diverticula.—Direct visualization of diverticula obviously is the most conclusive evidence of the presence of such structures. Whenever it is possible to visualize diverticula, diverticulitis generally does not exist. The associated spasm and edema of the involved segment of bowel when diverticulitis is present would preclude passage of a sigmoidoscope into that segment of bowel. The appearance of a diverticulum seen through the sigmoidoscope is described by Nesselrod as resembling tiny dark rooms opening at irregular intervals off a brightly lighted hall or tunnel. This is a very good description. The little black holes represent the opening or stoma of the diverticulum into the bowel (Plate 51). The diameter of the stoma will vary from 1 mm. to 1 cm. At times the diverticula will be seen to contain inspissated casts of stool (Plate 51) and sometimes pressure exerted with the end of the sigmoidoscope against the contiguous portion of bowel will cause the casts of stool to be extruded into the lumen of the bowel.

Rather infrequently I have seen diverticula everted (Plates 52 and 53) or turned inside out and projecting into the lumen of the bowel. Grossly they resemble small polyps. It is not necessary to elaborate on the consequences if such a polyp should be fulgurated unwittingly. Insufflation with a little air will blow the tiny mucosal sac out and a small dark hole will mark the place on the wall of the bowel where it had been.

VALIDITY OF THE FIVE SIGNS

In 1943 Buie and I reviewed the records of 400 consecutive patients who had diverticula of the sigmoid colon with the objective of comparing the proctoscopic with the roentgenologic findings and to determine the *validity of the five signs* just enumerated herein. The average age of these patients was fifty six years. Fifty three per cent or 213 of them were males and 47 per cent or 187 were females, which is about the usual ratio according to sex reported in the literature.

In 150 cases or 38 per cent proctoscopic examination was not done the diagnosis of diverticulosis or diverticulitis having been established clinically and by roentgenologic studies

In eight cases or 2 per cent a roentgenogram of the colon was not made the diagnosis having been established clinically and by proctoscopic examination

It was in the remaining 60 per cent or 242 patients for whom proctoscopic examination had been done and roentgenograms of the colon had been made that we were particularly interested Results of proctoscopic examination were negative so far as evidence of diverticula was concerned in eighty two of these cases meaning that involvement of the sigmoid colon was noticed above or proximal to the level reached by the sigmoidoscope However in the remaining 160 patients (66 per cent of the 242 cases) some evidence of the presence of diverticula was ascertained by proctoscopic examination

In thirty five patients (22 per cent of the 160) diverticula were visualized through the proctoscope

In an additional seventy two patients (45 per cent of the 160) the proctoscopist reported the presence of sigmoidal sacculations and because of this he requested roentgen ray studies of the colon which were made and which confirmed the presence of diverticula In fifty three cases (33 per cent of the 160) there was other evidence such as immobility of the sigmoid sharp angulation mucosal edema and an extrarectal mass which led to the suspicion of diverticulitis or diverticulosis So far as could be determined members of this latter group had had diverticulitis or had diverticulitis which was in an active phase at the time of the proctoscopic examination

PROCTOSCOPY AFTER COLOSTOMY

It is not within the province of this book to point out when medical management should give way to surgical intervention Certain complications which occur in diverticulitis demand at least colostomy if not more extensive surgical treatment These are (1) acute obstruction which has failed to respond to medical management (2) development of a fistula from the sigmoid into adjacent viscera and (3) formation of abscesses

In many instances colostomy is performed as an emergency procedure and the preoperative as well as the operative diagnosis may be indeterminate Proctoscopy as well as endoscopy carried out by way of the colonic stoma (Fig 22 and 23) may establish the differential diagnosis between carcinoma and diverticulitis It may be necessary to repeat the examination several times at various intervals as the acute inflammatory process subsides and also to use proctoscopes of smaller caliber so that all of the distal loop of bowel will be seen

Proctoscopy is a valuable adjunct to roentgenology in the diagnosis of diverticulosis and diverticulitis

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Chapter XXV

MISCELLANEOUS SUBJECTS

We shall deal with seven broad themes in the present chapter. They are: (1) fecal impaction, (2) melanosis coli, (3) tumors of the ischiorectal fossas, (4) injuries and foreign bodies of the terminal part of the bowel, (5) anorectal complications in leukemia, (6) pregnancy complicating lesions of the lower bowel and (7) lesions of the lower bowel in infants and children.

FECAL IMPACTION

Strange as it might seem, many patients afflicted with a large hard impacted mass of feces in the rectum actually will have diarrhea. Perhaps the mechanism of this paradoxic situation is not unlike the frequency of urination of a patient who has retention of urine, the frequency in such an instance actually being an overflow, with an attempt on the part of nature to rid itself of what is acting as a foreign body.

Fecal impaction may occur after the use of a barium enema in the making of roentgenograms of the colon. Impaction results from the patient's failure to pass all the barium. The condition also may follow operations on the anus in which the patient has received hypodermic injections of morphine to control the postoperative pain, with the consequence that the defecatory urge has been deranged. The longer the stool stays in the bowel the more dehydrated and harder it becomes. Fecal impaction tends to occur in nervous or tense persons who are too busy or too preoccupied with other matters to answer the urge to defecate.

In most cases fecal impaction can be managed without hospitalization of the patient. I have used the following method during the past year and have found it to be effective, particularly after certain operative procedures such as the correction of anal incontinence or repair of a third-degree perineal laceration. After such operations it is desirable to maintain the patient for

perhaps ten days or more without the passing of stools so that strain on the repaired area is obviated This is accomplished by rest in bed the use of drugs and a minimal residual diet and so on but during the ten-day period stool accumulates in the lower part of the large intestine and becomes dry and hard Elimination of such stool becomes a problem since the process of ridding the bowel of the stool might break down a satisfactory surgical repair of the primary condition

One or 2 fluid ounces of a 1 per cent solution of diocytl sodium sulfosuccinate (doxinate) is instilled in the rectum twice daily with the patient in the inverted position These instillations are started two or three days before the day of the expected first bowel movement The solution in question is an intestinal dispersion agent which by reducing the surface tension in the fecal mass brings about the formation of soft feces The action of the solution of doxinate is exerted only on the fecal matter itself If a bowel movement has not occurred within two or three days after the instillations have been started a plain water enema is given We have found that the foregoing procedure is very satisfactory and it is certainly less disagreeable for the patient and for the physician than attempts to break up the fecal mass with a finger

If impacted feces fill the entire rectum incontinence usually is associated so that it may be difficult for the patient to retain any kind of liquid In this event anesthesia and mechanical removal of the impacted mass may have to be used

MELANOSIS COLI

Melanosis *coli is a condition of no pathologic significance* characterized by pigmentation of the mucosa of the large intestine from the ileocecal valve to the mucocutaneous junction of the anus There is a sharp line of demarcation of the pigment at the ileocecal valve Most but not all patients who have the condition will report the use of some laxative agent or a preparation containing one of the anthracene cathartic products Occasionally a patient is seen who says he has never used any cathartic agent yet who has a fair degree of melanosis

Most investigators agree that the pigment involved is melanin

or a melaninlike substance similar to that in the skin and hair

Incidence—In the course of 19 294 proctoscopic examinations done in 1955 melanosis coli was diagnosed in 247 patients or about 1 3 per cent of those examined Speare reported melanosis coli to have an incidence of 1 per cent

The condition is about twice as common in women as in men and it is seen more frequently among elderly persons than among young people I presume a probable explanation of this is that the use of cathartic agents is more prevalent among women and elderly persons than among others

It is also true that melanosis is observed more frequently in persons who have some type of anal pathologic process such as a contracted anus In my opinion the contracted anus actually is the result of the use of cathartic agents and is secondary to it rather than that melanosis coli is secondary to the contracted anus The fact that the daily stool passed by these patients is liquid rather than formed eliminates the dilating action of the stool If there is any infection in the anal area there will be as is true elsewhere during the healing of an infection a certain amount of fibrosis The combination of these two circumstances may account for gradual anal contracture over a period of months or years

Speare reported that in his study the shortest period for the production of melanosis coli in patients to whom cascara was given daily was four months and the longest thirteen months After the use of cascara had ceased melanosis coli disappeared grossly in not less than five months and continued to be manifest as long as eleven months with an average of nine months It was his observation that melanosis coli would not develop in everyone who took cascara and that the condition could not be produced in young healthy persons no matter how long they took the cathartic agent

Proctoscopic Appearance—The intensity of the pigmentation will vary greatly from an intense black with tiny yellow dots representing the mucosal lymphatic follicles to a light tan The usual appearance is mottled (Plate 51) characterized by polyhedral markings Nesselrod wrote that this is thought to be caused by the mucosal and submucosal vascular network The

intensity of the pigmentation is more marked in the distal part of the rectum and frequently it will fade as the proctoscope is advanced proximally On several occasions I have noted that if an adenomatous polyp or an adenocarcinoma coexists with melanosis coli the proliferative tissue does not take up the melanin

Microscopic Appearance — The melanin is deposited in the deeper layers of the mucous membrane and submucosa (Fig 53) The pigment is found principally in the cytoplasm of large mononuclear cells in the submucosa There is no pigment in the surface epithelial cells

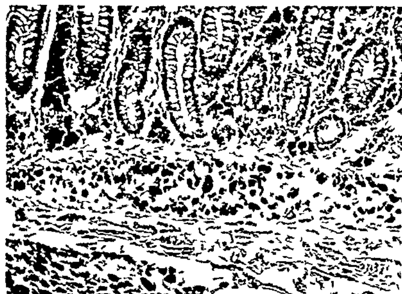


Fig 53 Melanosis coli Notice the pigment stored in the tunica propria in polyhedral cells Some pigment is extracellular with deposits beneath the muscularis mucosae (hematoxylin and eosin ×150) (See Plate 54)

Significance — Aside from the fact that most patients in whom melanosis coli is seen have acquired the habit of using laxative agents the main importance of the condition is that the inexperienced examiner may confuse it with something more significant I have seen several patients who had melanosis coli that had been mistakenly diagnosed as colitis Melanosis coli is noted rather commonly proximal to an obstructive lesion whereas the mucosa distal to the site of obstruction is grossly normal

TUMORS OF THE ISCHIOANAL FOSSAS

The ischioanal fossas (Fig 3) are situated on either side of the anus Normally they are filled with fibrofatty tissue Each is pyramidal with the base pointing backward and the apex pointing anteriorly and medially Anteriorly these fossas are separated from each other by the rectum and prostate gland or vagina as the case may be Posteriorly they are in contact except at the anococcygeal raphe Their lateral walls are relatively rigid and are formed by the ischial rami covered by the obturatorius internus muscle and its fascia Lying in a reduplication of this aponeurosis are the internal pudic vessels and nerves *The medial wall is relatively mobile It is composed from* above downward of the levator ani internal sphincter and external sphincter muscles The levator ani muscle separates the fossas from the subperitoneal or pararectal space The bases of the fossas are represented by the skin and superficial fascia The apex is formed by the junction of the fascia of the levator and that of the obturatorius internus muscles The fossas are about 5 cm long (that is the anteroposterior diameter) 2 5 cm wide (that is laterally) and 5 to 7 cm deep (that is vertically) The fascia lining the fossas is continuous with the fascia covering the gluteus maximus muscle laterally and Colles fascia anteriorly The inferior hemorrhoidal vessels and nerves pass through the fossas Posteriorly a very thin fascia separates the two fossas[3]

The three most common tumors occurring in the ischioanal fossas are (1) *inflammatory processes* (abscesses) (2) *lipomas* and (3) *sebaceous cysts* If the abscess is acute or subacute there is usually no problem in differential diagnosis Rather it is the chronic well-encapsulated so-called hidden abscess in which the usual signs of inflammation such as redness pain and swelling are absent that presents a problem in differential diagnosis

The chronic hidden abscess does not manifest inflammatory reaction because either it is draining back through its primary source or the infection has been overcome and a variable amount of pus and inflammatory debris has become encapsulated creating a lump of variable size

Subjective symptoms may be absent or if they are present

are not definitely peculiar to either the chronic abscess or to a lipoma There is usually a painless swelling in that region with some discomfort principally because of the size of the lesion on sitting or during defecation Some patients and particularly those with large lipomas will ask that the mass be removed because of the inconvenience it causes at defecation In the presence of both the chronic abscess and the lipoma there is usually some asymmetry of the gluteal cleft In general lipomas in this area have developed to considerable sizes before the patient is aware of them and this helps in the differential diagnosis

Sebaceous cysts occur in the region of the ischiorectal fossas As a rule differential diagnosis is not difficult because the cyst is adherent to the skin

Bidigital examination (Fig 21) meaning the examiner s squeezing of the tissue in the fossa between the thumb and index finger will help to determine the size of the lesion

Because of the trauma to which this area is subjected in sitting chronic abscesses and sebaceous cysts tend toward bouts of acute flareups and therefore they should be excised when discovered even though they may be asymptomatic at the time

INJURIES AND FOREIGN BODIES OF THE TERMINAL PART OF THE BOWEL

Injuries of the anus and lower part of the large intestine are seen fairly commonly in civilian practice A classification of such injuries based on causation would seem to be reasonable Such a classification would contain three categories (1) medical and surgical injuries (2) foreign bodies and (3) gunshot wounds and blast injuries

Medical and Surgical Injuries—Injuries of this type have a considerable variety of causes Some of these injuries are acci dental usually they are the results of poor technic employed by inexperienced personnel Other injuries to the lower bowel such as those resulting from surgical procedures are in the nature of calculated risks contingent on the extent of the surgery carried out on adjacent structures In a report by McLean and Smathers[8] based on fifty two patients with rectal injuries who came

to their attention between the years 1945 through 1952 67 per cent of the injuries were incident to some type of examination or treatment. Our experience at the Mayo Clinic has been somewhat similar to this. By far the majority of such injuries are incident to what we have grouped as *instrumentation injuries*. In the preparation for proctoscopy the patient is instructed to cleanse the lower part of the bowel with enemas. In so doing the patient may gouge the mucosa of the anterior rectal wall with the enema tip (this has already been discussed in Chapter VI in the section on mucosal ulcerations) (see Plate 6). Usually the resulting wound is minor and heals spontaneously without any attention. Occasionally bleeding may be profuse and if it is coagulation may be required to control it.

Such injuries certainly are not always inflicted by the patient but even trained personnel in administering enemas, inserting rectal tubes or rectal thermometers produce such wounds some of which might be fairly extensive. Cases have been reported in which the enema tip was pushed completely *through the anterior* rectal wall into the peritoneal cavity. Such an accident of course creates a surgical emergency necessitating closure of the defect and cleaning out of the peritoneal cavity.

Other instrumentation injuries reported in the literature are perforations of the bowel after removal of a specimen of tissue for biopsy or the passage of a cystoscope through the posterior urethra into the rectum. In my opinion at least some of the biopsy perforations are caused by removal of a specimen of tissue from a sigmoidal "polyp" that actually is not a polyp at all but an everted diverticulum. Injuries of the bowel caused by instrumentation at the time of proctoscopy already have been *discussed* in the section on the technic of proctoscopy in Chapter III.

Klein and Scarborough reported on eleven cases of *perforation* of the distal part of the bowel at proctoscopy. All these accidents were considered by the authors to be the results of errors in technic such as (1) blind introduction of the proctoscope, (2) reinsertion of the obturator to overcome *spasm*, (3) attempted forceful dilatation of a stricture with the proctoscope, (4) injudicious use of long cotton tipped applicators, (5) excessive fulguration of a polyp and (6) the taking of a full thickness of the wall

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of the bowel adjacent to a carcinoma for biopsy There were three deaths in the eleven cases of perforation

Most perforations of the lower bowel inflicted surgically might be considered to be justifiable as a risk contingent on the extent of the surgery that is necessary such as resection for an extensive neoplasm of the uterus or ovaries invading the lower bowel In some instances however the perforation is caused by poor surgical technic If the damage is recognized and repaired immediately the prognosis is good In the six cases of this type of perforation reported by Klein and Scarborough all the injuries were recognized and repaired at the time and recovery was uneventful

Radiation proctitis and chemical proctitis or injuries already have been discussed in the section on mucosal ulcerations in Chapter VI

Obstetrical injuries to the lower bowel are surprisingly uncommon in recent years most likely because of the high standard of maternal care at the time of delivery Third degree lacerations at childbirth are being seen less commonly as a result of improved judgment and technic on the part of the obstetrician and if such injuries to the anus and rectum do occur immediate repair after delivery usually gives excellent results

Foreign body Injuries —Foreign body injuries are of two types depending on causation (1) ingested foreign bodies and (2) inserted foreign objects Most *ingested foreign bodies* which pass through the stomach will pass through the remainder of the intestinal tract without difficulty even if the object is sharp If difficulty is experienced the point of lodgment of the object such as a sharp piece of bone or a tack generally is in the anal canal Since the anal canal is well supplied with sensory nerves pain is the predominant symptom If the object is not removed for several days an abscess may develop and then the picture presented is that of a typical ischioanal abscess

Inserted foreign bodies that have come to my attention figure in impalement of an individual by falling or sitting on a protruding object Since I practice in what is primarily a rural community most such injuries that I have seen personally have been sustained by farmers A farmer after he has completed a haystack may slide down the side of the stack and become im

paled on the handle of a pitchfork This particular type of injury has been seen less frequently during the past few years because *modern farmers bale their hay* instead of stacking it The literature contains reports of innumerable types of protruding objects that have impaled different persons and as might be suspected because of their occupation and habits males and children are the most frequent victims

Injuries from impalement are of two main types First the protruding object may enter the anal canal directly causing it to be lacerated or the object may produce no injury at all other than the immediate trauma Second the object may enter the rectum after passing through the buttocks or perineum In such *an event the extent of the injury within the rectum is variable* depending on the force of the fall and the size and angle of the penetrating object Generally the damage to the rectum is inflicted on the anterior rectal wall in the region of the rectovesical space or cul de sac The injury may involve only the *mucosa or it may penetrate the wall of the bowel and extend* into the peritoneal cavity

It has been my repeated observation that when rectal injuries from impalement have been sustained, even though the peritoneal cavity may have been penetrated the patient remains in surprisingly good condition for several hours after the injury Shock is either absent or mild, and loss of blood usually is minimal Sometimes the patient will walk into the hospital or physician s office unassisted If the penetrating object enters through the anal canal without injuring it valuable time may be lost *in arrival at the diagnosis of peritoneal penetration*

The *diagnosis* as to the extent of the injury can be considered under five categories

1 Local examination of the perineum perianal area and buttocks may reveal nothing at all or a variable degree of bruising with some extravasation of blood into the tissues If the object has pierced the buttocks or perineum an attempt should be made to determine the direction of entry by gentle probing of the wound The results of this maneuver *plus the description* of the position of the patient when he sat or fell on the object are important as a clue to the site of the internal injury

2 Digital examination of the anus and rectum may reveal a rent in the bowel The presence of blood on the examining finger is significant even if the site of injury cannot be palpated

3 Proctoscopy is always indicated even if the results of local examination are negative and even though the patient seems to be in good condition The insufflation of air at the time of proctoscopy should be carried out with caution (if indeed it should be done at all) and enemas should not be used in the preparation for proctoscopy for the obvious reason that if a perforation exists the chances of peritoneal contamination are increased by the use of enemas Often when the peritoneal cavity has been perforated the amount of blood in the rectum is surprisingly small The site of injury in the bowel wall may be sealed over with clotted blood Probing of the area gently with the suction tip or a small catheter may make a definitive diagnosis possible

4 Urinalysis should be carried out routinely and if the patient is unable to urinate (as is frequently the case when there is associated perineal trauma) he should be catheterized to determine the presence of blood If blood is grossly present cystoscopy is indicated for determination of the extent of urethral injury or damage to the bladder

5 Abdominal examination may reveal only slight tenderness in the lower part of the abdomen during the first few hours After six or eight hours however rigidity may be marked and intestinal sounds may be absent and eating peritonitis

6 Roentgenograms of the abdomen should be made if there is doubt as to whether or not the abdominal cavity has been entered The presence of air under the diaphragm with the patient in the erect position indicates penetration distended loops of intestine may suggest the onset of peritonitis Barium enemas should not be used since additional contamination would result therefrom

From a clinical standpoint the time that elapses between the injury and the beginning of treatment is all important Early diagnosis plays a more favorable role in determination of the prognosis than does the extent of the injury Narcotic agents should not be administered until a definitive diagnosis has been made

Although detailed treatment is not within the province of this work the current plan of treatment can be summarized as follows (1) the use of antitetanic and antigas gangrene serum (2) early *performance of laparotomy with repair of the defect* if feasible without performance of colostomy (3) performance of colostomy with complete shunting of the stool if the injury is extensive with considerable destruction of tissue and (4) administration of the appropriate antibiotic agents

Other inserted foreign bodies include those which are inserted accidentally such as a rectal thermometer or an enema tip Such objects are rather easily removed through an anoscope or proctoscope with use of a biopsy forceps to grasp the object

Foreign bodies inserted into the rectum as a means of erotic *gratification are reported upon frequently in the literature* generally the incidents take place in large urban centers They include a great variety of large cylindrical objects such as beverage bottles and they create a considerable problem of removal Trauma or injury to the anus or rectum or both usually is incurred *during removal of such objects Since the problem in each* case is somewhat different depending on the size shape and location of the object the ingenuity of the surgeon is called upon as to the best plan of approach

Other foreign bodies may enter the bowel from the peritoneal cavity *Instruments or sponges left in the abdominal cavity* at the time of laparotomy are examples The site of presentation of such objects is the anterior wall of the rectum in the region of the cul-de-sac of Douglas or the rectovesical space because this is the most dependent part of the pelvis

Gunshot Wounds and Blast Injuries—Gunshot wounds and blast injuries of the lower bowel are seen occasionally in civilian practice as the results of hunting accidents or in the case of blast injuries as the results of pranksters use of *pneumatic equipment* to blow up the bowel of a fellow workman As might be expected the extent of the injury varies greatly and each creates an individual problem in diagnosis and treatment Underwater blast injuries were reported rather often in the literature during *World War II After the sinking of a ship* sailors stranded in the water at the time of an underwater explosion in the vicinity

sometimes were victims of severe injuries to the lower bowel as the result of the sudden forcing of water into the rectum under great pressure

ANORECTAL COMPLICATIONS IN LEUKEMIA

Sometimes the presenting complaint of the patient with regional ileitis may be an anal abscess or fistula (Chapter IX) Likewise the presenting complaint of some patients with acute leukemia may be oral anorectal or both Just as the leukemic patient whose main complaint is a sore mouth with bleeding and ulcerating gums will have his teeth extracted by the unwary dentist so also will the leukemic patient whose initial symptoms are predominantly anorectal have some type of operative procedure performed on the anus by the unwary physician Any such procedure will only make the patient more miserable frequently will result in a wound that bleeds profusely over a considerable period and heals slowly if at all and probably will hasten the patient s death

In 1935 Blank reported upon patients with leukemia who had severe anorectal complications and he called attention to the fact that although there were frequent references in the literature to the pathologic changes in the oral cavity and gastro intestinal tract in these patients very little had been reported about the anorectal complications

In my personal experience the complications of leukemia referable to the lower bowel while not so frequent as oral bleeding and ulceration are by no means rare Since a tendency toward bleeding is great when this blood dyscrasia is present internal hemorrhoids if *present* are very likely to bleed In addition to the rectal bleeding other complications that have been noted are hemorrhoidal thrombosis anorectal ulcerations and the formation of perianal abscesses These lesions of course are commonplace and certainly are not peculiar to the leukemia Because of this many of the conditions I have just named are unwittingly treated surgically when a more efficacious course would have been to treat them conservatively

The only feature of these anorectal complications of leukemia which might arouse suspicion is the degree of severity When

hemorrhoidal thrombosis is present the necrosis sloughing and bleeding as a rule are out of proportion to what usually is seen Anal and rectal ulcerations if present, tend to be indolent or to increase in size rather than to heal Abscesses tend to be large and even after drainage they exhibit little or no evidence of regression

Since the anorectal complications that have been mentioned herein might be reported by some leukemic patients when they present themselves to the physician the only means of avoiding unwarranted surgical treatment in such instances is to be alert to the possibility and to order routine blood counts before any surgical treatment is proposed

PREGNANCY COMPLICATING LESIONS OF THE LOWER BOWEL

Most diseases of the lower bowel associated with pregnancy are not initiated by the gravid state but are manifestations of previously existing anorectal disease Still the symptoms of the existing anorectal disease may be precipitated or aggravated by the pregnancy and thus the aggravated anorectal condition properly may be termed a complication of an already present lesion of the lower bowel During the period of gestation any of the common or rare anorectal diseases may become symptomatic some of which pose a serious problem because of possible harmful effects to the mother or fetus Some of the more common problems arising when the two conditions coexist will be discussed

Proctoscopy During Pregnancy—It has been my experience that pregnancy in itself does not constitute a contraindication to the performance of a proctoscopic examination The patient may be examined in the usual manner meaning in either the inverted or left lateral Sims position The proctoscopist should be guided by the patient s reaction to the examination as to the distance the bowel has been visualized through the proctoscope Usually no difficulty is encountered in the insertion of the standard 25-cm sigmoidoscope

Similarly there is no contraindication to the use of cleansing enemas preparatory to the examination

Since symptoms arising from lesions of the lower bowel often are aggravated during pregnancy, obstetricians should advise prospective mothers who have minor symptoms to be examined before pregnancy so that appropriate steps can be taken to correct the problem or to advise the patient

Hemorrhoids.—Various reasons have been advanced to explain the fact that symptoms arising from hemorrhoids are more common during pregnancy than at other times Pressure of the enlarged uterus on the vascular trunks with the associated congestion and weakening of the walls of venules is a plausible theory The lack of valvular support within the portal system plus the increased intra abdominal pressure incident to defecation also may increase the congestion and weakening of the walls of the hemorrhoidal vessels with resulting loss of blood Extravasation of blood into the perivascular tissue will result in thrombosis and edema

The treatment of the hemorrhoids or complications therefrom resolves itself into two phases (1) preventive and (2) active As indicated above prospective mothers who have had considerable difficulty with hemorrhoids in the past or during previous pregnancies should undergo hemorrhoidectomy The question often arises as to whether or not subsequent pregnancy will cause a recurrence of the hemorrhoids In my experience if the hemorrhoids are completely removed future pregnancies will not cause them to return

Other measures which might possibly help to prevent or to minimize symptoms from hemorrhoids as well as from other anorectal conditions such as anal fissure anal pruritus and so on are the institution of a proper diet regular bowel habits exercise and attention to local hygiene

Active measures in dealing with hemorrhoids under the conditions in question consist of hemorrhoidectomy excision of thrombi injection therapy and temporizing procedures There is considerable disparity of opinion among authors as to whether or not hemorrhoidectomy is ever justifiable during pregnancy Pope implied that it is unwise to perform anything other than minor procedures such as excision of a thrombus or perhaps to administer injection treatment While it is certainly true that

the treatment in each case must be individualized and that the physician should be guided by the severity of the symptoms hemorrhoidectomy is indicated for and feasible in *some patients* I have not witnessed any untoward effects on the fetus or the mother when the procedure has been performed Most of the patients for whom I have carried out hemorrhoidectomy have been in the second trimester or first part of the third trimester of pregnancy During the last part of pregnancy *if possible* it is probably best to postpone surgical treatment until after the puerperium because of the strain that labor would put on the newly formed scar tissue

There is no contraindication to the excision of a localized thrombus with the aid of local infiltration anesthesia at any time during the gestation period Some patients when bleeding from internal hemorrhoids is a considerable problem may be treated by the injection of a 5 per cent solution of quinine and urea Rest in bed with the hips elevated hot or cold compresses and topical anesthetic ointments are of some value if temporizing measures are considered advisable in a particular case

Anal Abscess and Anal Fistula —Anal abscess and anal fistula are not any more likely to occur during pregnancy than they are in the nonpregnant state If an anorectal abscess should develop wide incision and drainage should be performed as soon as pus has accumulated In most cases fistulectomy or fistulotomy may and should be postponed until sometime after delivery If the secondary opening of the fistula heals over and an abscess re forms definitive surgical attention to the fistula is indicated

Anal Fissure —Anal fissure is not particularly common during pregnancy nor does the pregnant state predispose to it As a temporizing measure hot anal irrigations with use of an enema bag and catheter *in the manner described in Chapter XXIII* in the section on physical therapeutic measures in the relief of anorectal pain sometimes will afford relief It may be necessary to establish drainage for the fissure by excision of the sentinel pile or any overhanging edge This can be carried out in the *office with the aid of local infiltration anesthesia*

Carcinoma of the Lower Bowel —Fortunately the combination of pregnancy and carcinoma of the lower bowel is rare

not by reason of specific immunity of the gravid state to the development of neoplasms in the bowel but because of the difference in the incidence according to age of the two conditions Cancer of the large intestine is a serious problem especially if the neoplasm is situated in the lower bowel below the brim of the pelvis in a position to obstruct the birth canal The problem involves an attack on a disease that is threatening two lives In general two features of the problem will guide the type of therapy They are (1) the operability of the lesion and (2) the stage of viability of the fetus Therefore treatment has to be individualized but during the past several years the practice of interrupting pregnancy when cancer of the lower bowel is diagnosed has changed In 1955 McLean and associates collected fifteen cases in which primary carcinoma of the rectum had been diagnosed in the first two trimesters of pregnancy In none of the cases was termination of the pregnancy considered and after appropriate surgical treatment for the carcinoma one patient died of peritonitis and only two sustained abortion In the opinion of these authors if the diagnosis of carcinoma of the terminal part of the bowel is made prior to the twentieth week of gestation the lesion should be treated without regard for the pregnancy Between the twentieth and twenty seventh week treatment should be employed according to the extent of the malignant process namely (1) if the lesions are early or presumably curable treatment ought to be hysterotomy and removal of the lesion without delay and (2) if the malignant process is advanced treatment by Porro cesarean section should be done after the thirtieth week followed by appropriate palliative treatment for the malignant process After the twenty seventh week cesarean section should be done between the thirtieth and thirty second weeks with resection of the lesion at that time or soon thereafter

Complications from the carcinoma such as obstruction hemorrhage or perforation demand immediate treatment without regard to the pregnancy

Chronic Ulcerative Colitis—There is great variance of opinion among authors as to the effects of pregnancy on chronic ulcerative colitis The colitis of some patients seems to be abated by

Lesions Common to Both Child and Adult, but With Different Manifestations.—Polyps (adenomas) of the large intestine seem to be different in the pediatric age than they are when they afflict adults. In the child grossly the polyp usually has a smooth surface, feels much firmer on palpation and is of the same color as the adjacent normal mucosa. A specimen removed from the polyp frequently is reported by the pathologist as "inflammatory tissue" rather than as adenomatous tissue. Microscopic sections of the entire polyp will show that it is composed principally of connective tissue and chronic inflammatory elements and little or no adenomatous structure. The microscopic picture is supported by the clinical evidence that polyps of the large intestine among patients fifteen years old or younger rarely if ever become malignant. By contrast, the microscopic picture in adults of what grossly appears to be a polyp or adenoma will more often than not show carcinoma in situ or low grade malignant cells.

Chronic ulcerative colitis is not as rare in infancy and childhood as is generally presumed. In a study of 871 cases in which this disease occurred among children and adults, we[1] found that ninety-five of the 871, or 10.9 per cent, experienced the first symptoms of their disease before the age of sixteen years was reached. The disease is particularly devastating when it occurs in childhood. At the onset, the disease in children tends to be more fulminating or severe than it is in adult persons. Complications of the disease also are more extensive in children. Other phases of this disease as it pertains to both children and adult persons are discussed in Chapter VII.

Anorectal abscesses and fistulas among members of the younger age groups are not common but they do occur and constitute about 1 per cent of those that we see.

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Chapter XXVI

MALIGNANT DISEASE OF THE ANAL AND PERIANAL AREA

Compared to neoplasms of the lower bowel malignant lesions of the anus and perianal region are relatively rare the ratio being about 100 to 1

CLASSIFICATION

A satisfactory working classification would have three main categories

First are premalignant lesions meaning leukoplakia (leukokeratosis) and actinodermatitis

Second is carcinoma in situ which includes Bowen s disease Paget s disease and the intra epidermal epithelioma of Borst and Jadassohn

Third are malignant processes in general such as squamous cell epithelioma basal-cell epithelioma and malignant melanoma

PREMALIGNANT LESIONS

Leukoplakia and Leukokeratosis—These two terms are synonymous The occurrence of either lesion in the anorectal region is uncommon In 1939 Pumphrey found records of only seven instances of leukoplakia of the anorectum among patients seen at the Mayo Clinic up to that time Most of his patients were elderly *Whether or not leukoplakia in this area has the same malignant propensities as it does in the mouth is unknown It is presumed that it does have such a potentiality, but on the other hand I have not seen a patient with leukoplakia of the anorectal region in whom a malignant lesion of the area in question subsequently developed*

Diagnosis—The process has the gross appearance of grayish white thickened skin It may grow upward onto the rectal

mucosa (Plate 55) and if it does the appearance is striking and the diagnosis is relatively easy The marked contrast between the very white plaque and the adjacent normal red or pink rectal mucosa is obvious On two occasions I have seen these white fingerlike projections of leukoplakia extend as high as the rectosigmoid When the process is confined to the anal and perianal regions *the diagnosis* may be more difficult because the *condition* can be *confused* in particular with *maceration* of the skin caused by long-continued moisture in the area If some degree of excoriation is associated with the white thickened skin the gross picture may suggest squamous or basal-cell epithelioma It is sometimes difficult to distinguish it from psoriasis of the anal region but if psoriasis is at hand psoriatic lesions usually exist elsewhere as well

The final diagnosis of course rests upon removal of a speci men of tissue for biopsy and microscopic study of sections If the site of the process is anal local anesthesia must be employed to obtain satisfactory specimens of tissue

Microscopic Aspects —Microscopically at least leukoplakia certainly would suggest malignant possibilities The nuclei in the basal skin layers are hyperchromatic and irregular and occasion ally mitotic figures are seen The skin is greatly thickened and hyperkeratotic liquefaction and dyskeratosis of the basal cell layers are seen (Fig 51)

In contradistinction to leukoplakia in the buccal regions where the cause of it is thought to be long-continued trauma or excessive smoking leukoplakia in the anorectal region is of obscure origin

Actinodermatitis —Actinodermatitis or roentgen ray dermatitis is seen rather commonly in the perianal area It is caused by an overdose of x rays used in the treatment of anal pruritus At best roentgen ray therapy gives temporary relief from the pru ritus for six months to perhaps a year When the symptoms recur the patient seeks more roentgen ray therapy which has a cumulative effect The result will vary from telangiectasis of the skin or increased pigmentation or both Occasionally the tissue breaks down into superficial ulcerations that weep or the condition may progress to varying degrees of deep ulcera

tions with a sloughing gray base (Plate 60) There is a definite tendency toward malignant degeneration to a low grade epithelioma If there is any ulceration or a tendency toward ulceration the treatment is surgical (meaning wide excision with the application of full thickness pedicle skin grafts)

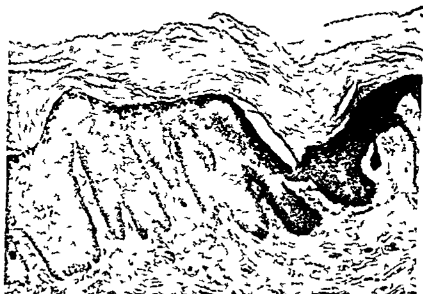


Fig 54 Leukoplakia of the perianal skin Notice the hyperplasia and hyperkeratosis (hematoxylin and eosin x30) (See Plates 53 and 74)

Diagnosis—The diagnosis of actinodermatitis as a rule is obvious on inspection especially if there is a history of roentgen ray therapy for anal pruritus Specimens of tissue for biopsy should be removed from the edge of the ulcerated area with the aid of local infiltration anesthesia

CARCINOMA IN SITU

Any type of carcinoma may theoretically at least occur in situ Broders has defined this process as a condition in which malignant epithelial cells and their progeny are found in or near positions occupied by their ancestors before the ancestors underwent malignant transformation At least they have not migrated beyond the juncture of the epithelial and connective tissue or the so-called basement membrane

Carcinoma in situ may be associated with senile keratosis

actinodermatitis and xeroderma pigmentosum

Bowen's Disease.—This condition is one type of carcinoma in situ. It is a chronic intra-epidermal squamous-cell epithelioma in situ which infrequently occurs in the anal and perianal regions. According to Montgomery, in 20 per cent of cases Bowen's disease will develop into an active squamous-cell epithelioma.

Gross Appearance.—The gross appearance might be somewhat suggestive of Bowen's dermatoses. Usually a single lesion is seen; it is a slightly raised, firm, irregular, brownish-red plaque with a scaly surface. It will be 1 to 5 cm. in diameter and will retain its size for years, and then it may start to increase and to become an invasive squamous-cell epithelioma.

Histologic Appearance.—The histologic appearance is that of a squamous-cell epithelioma in situ containing anaplastic prickle cells throughout the epidermis. So-called Bowen cells are seen, which consist of large cells with single or double hyperchromatic nuclei which generally show some degree of vacuolization.[8] They are referred to as "haloed giant cells," the haloed effect being caused by intracellular edema. Contrary to the situation in Paget's disease, the intercellular prickles in the malpighian layer are always present. The basal-cell layer is intact. Below the epidermis inflammatory round-cell and plasma-cell infiltration is seen (Fig. 55).

Diagnosis.—The diagnosis is made by histopathologic examination, although the gross appearance is suggestive. The condition has to be distinguished from squamous-cell and basal-cell epithelioma as well as senile keratoses, leukokeratosis and Paget's disease of the anus.

Treatment.—The treatment is wide surgical excision, and from the tissues thus obtained many microscopic sections should be made to see if there is any evidence of invasion. Occasionally the diagnosis is made unexpectedly by the pathologist when he is studying microscopic sections of external hemorrhoidal tissue.[12]

Paget's Disease (Extramammary Paget's Disease).—The condition known as "Paget's disease" is not rare in the female mammary area, but extramammary Paget's disease of the anus, vulva or axilla is rather rare. According to Montgomery, the disease is an epithelioma in situ of multicentric origin from the epi

dermis and dermal appendages (apocrine glands) There is disparity of opinion as to whether Paget's disease is autochthonous or metastatic from the underlying glandular structures Most pathologists feel that the subepidermal carcinoma is *primary* and that it possesses epidermotropic properties through which the epidermis is involved secondarily Dockerty and Pratt wrote that one of the difficulties encountered in attempts to evaluate the pathogenesis of Paget's disease of the skin has been the inability to identify the parentage of the Paget cells that constitute the sine qua non for establishment of a diagnosis They further wrote that in this regard the almost constant *association of an underlying glandular carcinoma has carried* much weight of evidence in favor of the metastatic concept of pathogenesis In all the four cases reported by these authors underlying adenocarcinoma was detected



Fig 55 Bowen's disease (grade 2 squamous-cell epithelioma in situ) There are mitosis pyknosis and irregularity of nuclei in the epidermis There is no invasion through the basement membrane (the separation of subcutaneous tissue is an artefact) (hematoxylin and eosin x175)

Gross Appearance—I have seen two patients with perianal Paget's disease one of whom was reported upon by Dockerty and Pratt in 1948 The other patient was seen in June of 1957

The condition of neither of them was diagnosed clinically as Paget's disease although in both instances the lesions were considered to be some type of neoplasm epithelial in origin The area of involvement in both patients was relatively large extending from the anal verge peripherally for about 3 to 6 cm and extending for about two thirds of the perianal circumference The margins of the lesions were sharply defined slightly raised pink or reddish in color with an oozing moist macerated and nonulcerated surface (Plate 71) Both patients complained of a burning and itching sensation and said there was moisture constantly in the area The history of the onset of symptoms was rather indefinite but in both instances itching and moisture had been present for several years On the basis of the cases of extramammary Paget's disease reported in the literature of which there are fewer than two dozen (only eight of these in the perianal area) the symptoms and gross appearance described above are those usually recounted

Diagnosis—The diagnosis rests on the histopathologic evidence and not upon study of clinical phenomena which may be reproduced by squamous-cell or basal-cell epithelioma senile keratosis Bowen's disease perianal psoriasis and even ordinary pruritus ani

Microscopic sections show pale staining cells (Paget cells) scattered throughout the epidermis Some of these cells are filled with mucus The nuclei are large and vesicular There are intercellular edema hyperkeratosis and parakeratosis[10] Dockerty wrote and I agree that the search for underlying carcinoma should be exhaustive

In the previously mentioned patient whom I saw in June of 1957 wide local excision was carried out Microscopic examination of the tissue removed showed an underlying invasive grade 3 adenocarcinoma and because of this combined abdominal perineal resection subsequently was performed

Prognosis—The prognosis associated with perianal Paget's disease must necessarily be guarded because of the frequent association of this disease with an underlying malignant process

Intradermal Epithelioma of Borst and Jadassohn—This lesion although considered by some to be a separate entity is now thought to be a basal cell epithelioma by most pathologists"

ANAL AND PERIANAL MALIGNANT PROCESSES

There are three types of anal neoplasms squamous-cell epitheliomas basal-cell epitheliomas and malignant melanomas If such a lesion is suspected it is imperative that a histopathologic diagnosis be made because the nature of the treatment and the prognosis vary greatly For instance true basal-cell epithelioma do not metastasize and therefore local excision should be followed by a good prognosis The exact antithesis of this situation is the malignant melanoma which is almost always fatal regardless of the treatment

Squamous cell Epithelioma —This lesion compared to other anal or perianal neoplasms is of relatively frequent occurrence However compared to adenocarcinoma of the lower bowel it develops relatively infrequently Kerr found that 1 1 per cent of all malignant lesions diagnosed by proctoscopy were squamous cell epitheliomas In his series the ratio of males to females was 1 to 1 5 About three fourths (73 per cent) of Bacon s series of epitheliomas were grade 3 or grade 4[1]

Gross Appearance —The gross appearance varies greatly The lesion may appear as a slight thickening and elevation of the anal or perianal skin The involved area may feel firmer than does the surrounding tissue There is usually some ulceration (Plate 62) from which the patient may relate a serous bloody discharge has been noted Squamous cell epithelioma occurring in the anal canal usually is very painful and is difficult to examine clinically Such a lesion occurring at the anal verge or perianal region is more likely to cause symptoms of burning and itching than other manifestations

Microscopic Appearance —Microscopically irregular masses of epidermal cells are seen invading the subcutaneous tissue These cells exhibit varying degrees of differentiation Many atypical mitotic figures are seen and horn pearl formation is characteristic

Diagnosis —The diagnosis as a rule can be suspected clinically but occasionally when there are much anal spasm and tenderness adequate exposure is difficult and examination with the aid of anesthesia may be necessary The lesion has to be distinguished from other neoplasms in this area or from any anal or perianal ulcerations I have seen several patients with ectropion

of the rectal mucosa (Plate 61) which had been mistakenly diagnosed as an epithelioma In these patients the exposed red rectal mucosa was thought to be an ulceration and a malignant process was suspected

Prognosis—The prognosis is good if the lesion is of low grade and can be excised locally The high grade squamous cell epithelioma metastasizes early and is very radiosensitive Controversy exists as to the proper method of treatment There is no conclusive evidence that radical surgical treatment offers the patient who has a highly malignant epithelioma any better outlook than does radium therapy administered alone or in combination with local excision

Basal-cell Epithelioma—This lesion is rather uncommon in the anus It originates in the basal cell layers of the skin as the name implies It is seen in patients past forty years of age

Location—The location of anal basal-cell malignant lesions helps to set them apart They do not occur inside the anal canal but arise either at the anal verge or in the perianal region (meaning in skin that contains hair follicles) However a basal cell epithelioma may extend secondarily into or invade the anal canal

Gross Appearance—The gross appearance is that of a rodent ulcer The edges of the lesion appear to be rolled and the ulcer is relatively deep (Plate 63)

Microscopic Appearance—Microscopically the typical cell has an elongated dark-staining nucleus and little cytoplasm Around the border of the ulcer palisading of the cells is seen and occasionally tubular glandlike structures can be found which indicate differentiation toward adnexal tumors

Metastasis of true basal cell epitheliomas does not occur Reports in the literature which describe metastasis of this tumor seem rather to concern a lesion that is really a basaloid small cell carcinoma which ocurs at the mucocutaneous junction is extremely malignant and although histologically basaloid actually is squamous cell in origin [14]

Diagnosis—In the diagnosis consideration of the location plus the rodent ulcer appearance will help grossly to distinguish a basal cell epithelioma from other ulcers in this area

Malignant Melanoma.—Malignant melanoma of the anus is ectodermal in origin; it arises from melanoblasts situated in the anal epithelium or in an activated pigmented nevus. This lesion is considered by almost all writers on the subject to be extremely malignant, and metastasis generally is widespread by the time the lesion is first seen. In the seven cases reported by McQuarrie and Buie all the patients but one died within a few months.

Gross Appearance.—The lesion itself does not necessarily have to be pigmented. The metastatic tumors are said to be black and to contain large amounts of melanin. The two anal malignant melanomas which I have seen were located *in the perianal region*, looked and felt like black, hard nodules about 1 cm. or more in diameter, and were surrounded by red halos which seemed to indicate inflammation in or beneath the black nodules. Although ulceration was not present in either of the two patients concerned, it probably would have occurred soon.

Microscopic Appearance.—On microscopic examination the malignant changes are seen to begin at the derma-epidermal junction. There are nests of pigmented atypical tumor cells which exhibit much mitosis.

Diagnosis.—In the diagnosis, if the primary lesion is grossly pigmented there is no difficulty. If the primary lesion is unpigmented, which reportedly does occur, distinction from other perianal ulcerations would have to be made histopathologically.

Prognosis.—The prognosis in all reports in the literature is very pessimistic.[1]

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Chapter XXVII

THE DIFFERENTIAL DIAGNOSIS OF, AND CANCER DEVELOPING IN, ANAL AND PERIANAL SINUSES

DEFINITION

As used in this discussion the word "sinus" will indicate a suppurating channel which may or may not communicate with the anus or rectum. Although the differential diagnosis of various draining sinuses in this area frequently has to be made at the time of operation, certain findings are peculiar to various infections that produce draining sinuses in this region. These findings will serve as guides to the clinician in making a differential diagnosis.

ANORECTAL FISTULAS

As used here the word "fistula" implies that the sinus communicates with the anus or rectum. In a study carried out by Hill in 1951 on infections and sinuses other than fistulas in the perianal region he found that 86 per cent of the sinuses in the anal and perianal area did communicate with the anus or rectum and therefore were true fistulas and that the other 11 per cent were nonfistulous. A history of recurring abscesses may suggest that a given sinus is a fistula, but the repeated formation of abscesses certainly is not unique to a fistula. The location of the draining sinus also may be of help in the differential diagnosis. Usually the sinus or secondary opening of a fistula is within 1 to 5 cm. of the anal verge. Clinically and from an objective standpoint there are three methods which are helpful in the differential diagnosis.

Bidigital Examination.—The first means is bidigital examination. With the index finger in the anus the examiner may be

able to palpate induration at the suspected primary source of the fistula Squeezing and rolling the perianal tissue between the thumb on the outside and the index finger inside of the rectum frequently will impart the sensation of the cord or fistulous tract It is well also to compare the feel of the tissues on the opposite side or well away from that of the sinus or fistulous tract

Anoscopic Examination—The second means is anoscopic examination which sometimes will reveal the primary source of the tract It should be remembered that about half of all anal fistulas originate in a crypt at the dentate margin posteriorly A drop of pus may ooze from a crpyt to indicate the source or a scarred hole may be seen that will admit a probe Traction exerted on the tissue in the area of the secondary opening will create a pull on the scarred track and produce dimpling at the primary source in the anus

Probing—The third means is probing done with a fine platinum probe This may assist in the differential diagnosis If the probe seems to lead toward the anus when it is inserted into the sinus tract that evidence also is suggestive Yet as a rule probing does not provide too much information clinically and if it causes the patient much discomfort it is best to abandon it until the time of anesthesia and operation when it can be done much more effectively and without pain

As stated previously 86 per cent of anal and perianal sinuses would be classified as anorectal fistulas There are numerous causes for the other 14 per cent

Tuberculous Anal Fistulas Certain characteristics might suggest that a fistula is tuberculous The reader is reminded that the characteristics to be enumerated here are merely suggestive and that the final decision as to whether a certain fistula is tuberculous or nontuberculous must depend on the results of histopathologic studies of the excised tract of the inoculation of guinea pigs with material from the tract and of culture studies or combinations thereof

Clinical features suggesting that a fistula is tuberculous are as follows

First the anal or perianal abscess which precedes the forma

tion of the fistula meaning before a secondary opening has been established is relatively painless

Second the discharge from the secondary opening of the fistula tends to be thin and serosanguineous rather than thick and purulent

Third the secondary opening of the fistula tends to have a bluish discoloration and frequently there is a considerable heaping up of granulation tissue at this site

Fourth most tuberculous anal fistulas will have a primary focus at some other place in the body—usually the pulmonary region

In some of the older literature almost all anal fistulas probably because of the factor of chronicity were considered to be tuberculous In 1916 Buie and I reported our findings in 600 consecutive cases of anal fistula in respect to the tuberculous or nontuberculous nature of the lesions Records in each of the 600 cases were studied clinically with particular emphasis on location of a possible focus of tuberculosis at some place in the body In each case the patient had undergone excision of the fistulous tract or part of it at the time of operation Histopathologic study of sections of the tract was done and guinea pigs were inoculated with material from the tracts

On the foregoing bases we were able to answer certain questions *First should the presence of an anal fistula arouse the suspicion that pulmonary tuberculosis or a tuberculous focus is present in the body?* In 88 5 per cent of the 600 cases that we studied tuberculosis was not found either in the fistula or elsewhere in the body In the remaining 11 5 per cent of the cases tuberculosis either active or inactive was found somewhere in the body This percentage of 11 5 led us to conclude that the above question should be answered in the affirmative

Second what percentage of anal fistulas are tuberculous? The answer to a question such as this must be qualified For example in an institution which has to do principally with the treatment of tuberculosis the percentage of patients with anorectal fistulas is said to be much higher than it is in a general type of hospital It is a reasonably good assumption that almost all if not all the anal fistulas seen in a tuberculosis sanitorium would be tubercu

lous Our study which had to do with patients in a general type of hospital and was based upon the above mentioned criteria of clinical study histopathologic examination and inoculation of guinea pigs with material from the excised fistulous tracts showed that 8 per cent of anal fistulas are tuberculous Furthermore in nearly all instances (thirty three of thirty nine cases) in which the fistula was unmistakably tuberculous a focus of tuberculosis was found elsewhere in the body In six (1 per cent of the 600 cases studied) of the thirty nine cases of proved tuberculous fistulas a primary focus could not be found elsewhere in the body In one of these six patients active pulmonary tuberculosis subsequently developed In this particular patient it is possible that a very early active pulmonary lesion had been present initially but repeated studies of the original roentgenograms of the thorax did not yield evidence of the disease

PILONIDAL DISEASE

The next most common cause of a perianal sinus is pilonidal disease

Distinguishing Features —Generally an infected pilonidal cyst will have one or more draining or dimpled sinuses in the sacrococcygeal region (Plate 71) Occasionally there may be a tuft of hair protruding from a dimpled sinus in the pilonidal zone so that the location of the sinus probably is the most important distinguishing feature here Once in a while however the infection may burrow downward and point anywhere in the perianal region even anteriorly on the perineum In such an event it may be more difficult to distinguish the condition from an anal fistula but if sufficient time has elapsed the fibrous tract leading to the pilonidal zone will be palpable and almost always there will be dimpling in the lower midsacrococcygeal region

HIDRADENITIS SUPPURATIVA

This condition constitutes a fairly good percentage of the nonfistulous perianal sinuses and the *differential diagnosis* at times may be very difficult Hidradenitis suppurativa is the result of infection in the apocrine sweat glands These glands are located in the perianal axillary mammary inguinal and

genital regions and these areas are therefore the sites of predilection for the disease

In the early phases this disease is not easily distinguishable from other localized suppurative processes for instance hidradenitis suppurativa much resembles furunculosis Early it may appear as one or more subcutaneous nodules about the size of a pea which become soft and suppurate The process spreads by way of lymphatic channels and tissue spaces through the skin and subcutaneous tissues to a chronic phase associated with draining sinuses ulceration and undermining Also in evidence is an attempt at healing as manifested by scarring granulations and honeycombing of the skin (Plate 57) Sometimes it is confused with pilonidal disease and anal fistula while the converse also is true[6] In my opinion this fact in part at least explains some of the so-called recurrent pilonidal cysts and recurrent fistulas which are reported because the tendency toward recurrence or toward new areas of involvement after surgical treatment of hidradenitis suppurativa is fairly high

Differential Diagnosis—Perhaps the greatest help in the distinction of this condition from other sinuses in the perianal area is that in most patients there is coexisting involvement of the axillary zones or one of the other sites of occurrence of hidradenitis suppurativa Many patients who have this disease of the skin tend also to have a diathesis toward acne When hidradenitis suppurativa affects the perianal area alone as it did in forty-one of 388 patients (11 per cent) studied by McQuarrie and me[4] distinction from other sinuses may be more difficult and may rest on the findings at the time of operation

I have seen four patients in whom a large low grade squamous cell epithelioma was superimposed on long standing *hidradenitis* suppurativa of the buttocks (Plate 57)

INFECTIONS IN SEBACEOUS OR SWEAT GLANDS

Comedo Infection—Comedo infection is not rare in the perianal area In the skin about the anus comedones may become fairly large undergo inflammation and give rise to pustules and as the inflammation subsides a tiny superficial or *dimpled*

sinus may remain The presence of other comedones in the area will help to make the distinction from other conditions

Sebaceous Cyst—A sebaceous cyst results from an accumulation of sebaceous matter in a sebaceous gland so that a retention cyst is produced If this cyst becomes inflamed and suppurates as such cysts in this area often do a chronic nonfistulous sinus which drains periodically may result The patient s report of a painless subcutaneous mass that was present in the same location as the sinus prior to the onset of the inflammation is helpful in arrival at a differential diagnosis

Furuncles—Furuncles occur rather commonly in the gluteal fold and perianal area perhaps as a result of friction of the opposing skin surfaces or of tight clothing and insanitary habits Hidradenitis suppurativa in the early stages is identical to furunculosis A furuncle that tends to recur repeatedly in the same area suggests a fistula Furthermore furuncles do not leave sinuses that persist for any considerable period

TRAUMATIC SINUSES

There are several ways in which trauma may produce a chronic sinus in the perianal region First foreign bodies may be introduced through the skin accidentally by the patient s falling on an object I have seen workmen who had fallen on a sharp object such as the spout of an oilcan during which action some of the oil was deposited in the subcutaneous tissues setting up a chronic inflammatory reaction Subsequently a draining sinus developed

Second fat necrosis may occur on the buttocks or perianal region after a blow or fall The fat cells become necrotic inflammation occurs and a draining sinus may result When this type of sinus is present the history is the main help in arrival at a differential diagnosis

OSTEOMYELITIS

Osteomyelitis in the pelvic bones is not common I have seen several patients with perianal sinuses who had been mistakenly operated upon for an anal fistula but roentgen ray studies of the pelvic bones showed chronic osteomyelitis to be the source of the perianal sinus

DEVELOPMENTAL CYSTS

In 1953 Hawkins and I[3] called attention to a certain type of perianal sinus which seemingly was an ordinary anal fistula. Many of these patients had received definitive surgical treatment in an attempt to relieve what was for all practical purposes a common fistula in ano but the expected relief had not taken place and recurrent abscesses and sinuses developed. It was then discovered that these patients had an infected developmental cyst anterior to the coccyx or lower part of the sacrum. In the above mentioned paper forty cases of presacral or precoccygeal developmental cysts were studied. All the patients concerned had received the surgical diagnosis of a dermoid epidermoid or mucus secreting cyst.

Differential Diagnosis.—In the foregoing study certain conclusions were arrived at which might point the way to at least a presumptive preoperative diagnosis of certain perianal sinuses as arising from an infected developmental presacral or precoccygeal cyst.

First would be a history of recurring perianal abscesses and sinuses.

Second might be a history of previously repeated surgical attempts to eradicate such abscesses and sinuses.

Third could be the presence of a sinus if uncomplicated by infection with a funnel like dimple (Plate 70) located just posterior to the anal verge.

Fourth would be the presence of a presacral or precoccygeal mass.

Fifth would be the extrusion of hair or cheeselike substance or both from the anus or perianal sinus.

Finally the tendency of developmental cysts to arise among women (ratio of three females to one male) should be borne in mind by the examiner.

Sometimes these precoccygeal masses are discovered accidentally at the time of routine *proctoscopic* examination. Discovered at such a stage they of course would not have become infected but removal of the lesions at such a time is advocated since the chances of their becoming infected if untreated are great

(Plate 72) If infection occurs the surgical treatment becomes much more mutilating and is less likely to be successful

OTHER FACTORS

Among other factors which I have seen that less frequently cause perianal draining sinuses is *perforating diverticulitis* of the sigmoid with formation of abscesses which dissects down along the bowel and eventually produces a perianal draining sinus Frykman pointed out that this type of sigmoidoperianal fistula should be relatively rare because of the barrier represented by the endopelvic fascia and the pelvic diaphragm Extension of an abscess follows the path of least resistance which accounts for the far greater incidence of fistulous communication with adjacent viscera rather than with the perianal region in cases of sigmoidal diverticulitis *Foreign bodies* such as a sponge left in the presacral area at the time of surgical operation on the lower bowel eventually set up a reaction and may produce a draining sinus posterior to the anus

Nonabsorbable suture material used in a perineal repair may cause a draining sinus A *Bartholin s cyst* may become infected and produce a chronic draining sinus but the location of the sinus helps in the differential diagnosis

Less frequently seen causes of perianal draining sinuses are granulomatous diseases such as actinomycosis (Plate 67)

In the few instances of actinomycosis which I have seen the disease was not suspected clinically but was considered to be an extensive anorectal fistula The diagnosis was made histo pathologically from study of sections of tissue excised at the time of operation

Much can be learned clinically about the nature of a given perianal sinus but often further examination with the patient under the influence of anesthesia is the only means of making a definite diagnosis

CANCER DEVELOPING IN OR AROUND CHRONIC DRAINING SINUSES

Several reports of the development of cancer in or near chronic draining sinuses have appeared in the literature Various condi

tions accounting for the chronic drainage such as osteomyelitis empyema fistula in ano pilonidal cyst disease and hidradenitis suppurativa have been reported with carcinoma superimposed upon them The nature of the carcinoma is such that it is usually of low grade is slow of growth and may be basal or squamous-cell or adenocarcinomatous Generally the drainage will have been present for many years before the carcinoma appears

In 1931 Rosser reported seven cases in which carcinoma had developed in anal fistulas In five of the cases adenocarcinoma was found invading the fistulous tract seemingly originating at the primary source The sixth patient had a squamous-cell epithelioma at the secondary opening of the fistula located in the perianal skin *The seventh patient had been operated upon for* a fistula and an adjacent polyp a year before and the latter lesion had recurred

Isolated instances of a malignant process superimposed upon a sinus leading to a pilonidal cyst have been reported In most of these cases the lesion was of the squamous-cell type A basal cell epithelioma occurring in the wall of a pilonidal cyst in a fifty six year old woman was reported by Coldman and Kalow Nothing could be found in the literature in regard to the superimposition of carcinoma upon the chronic draining sinuses of perianal hidradenitis suppurativa As said previously in this chapter I have seen this complication in four patients

It is generally contended that irritation plays an important part *in the development of certain cancers* Perhaps the carcinogenic agent in the chronic cutaneous sinuses under consideration here is the irritation of the long-continued drainage from an inflammatory process Although the development of carcinoma in or around chronic draining sinuses is not common the lesion does occur frequently enough to justify advisal of the removal of the cause of the process

Most of these chronic draining sinus carcinomas have certain features in common First a long standing draining sinus must have been present Next if *carcinoma does develop* in such a situation it is slow growing and of low grade Finally although *metastasis has been reported* the neoplasm as a rule is amenable to wide local excision

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Chapter XXVIII

NONMALIGNANT ANAL AND PERIANAL LESIONS OF THE SKIN

A variety of nonmalignant lesions of the skin affect the anal and perianal area, some of which (such as hidradenitis suppurativa, condyloma acuminatum and pruritus ani) are more or less peculiar to the zone, whereas others arise fortuitously in that region. The list of perianal lesions of the skin to be discussed herein is by no means complete. Conceivably almost any cutaneous lesion could occur in the vicinity of the anus, but only those lesions which I have encountered and which have given rise to a problem in differential diagnosis will be dealt with in this chapter.

ANAL PRURITUS

The condition known as "anal pruritus" actually is a symptom of many conditions and is not a disease entity. Since the main symptom of several anal and perianal cutaneous lesions is itching, *all the local conditions which cause pruritus will be discussed* under the heading of "anal pruritus."

Causation.—Pruritus ani is a common condition which occurs predominantly among males (about 70 per cent males to 30 per cent females). In the male it frequently is associated with perineal and scrotal itching, whereas in the female pruritus vulvae commonly coexists.

It seems reasonable to consider the causative factors of pruritus ani *under the three headings used by Nesselrod*, with incidental modifications. The causes then can be considered (1) *systemic*, (2) *local* and (3) *psychic or functional*. Many of these factors will overlap, and although the anal pruritus of a given patient may start from a purely local cause, subsequent developments may place it in the functional category. Again, even though local

causes may be eliminated the itching may persist Satisfactory treatment consists of combating not one factor at a time but of treating as many factors as possible at the same time

Systemic Causes—Although the variety of systemic conditions which may cause anal pruritis is considerable the anal pruritis of less than 5 per cent of all patients is of systemic cause Probably the systemic factor which most commonly causes or at least aggravates anal itching is *obesity* This cause could be listed equally well as psychogenic since most authorities on obesity currently feel that the reasons for the obesity of their patients are psychic I do not mean to imply that all obese patients have anal pruritus Nevertheless anal itching is aggravated by obesity which prevents ready ventilation of the area and allows accumulation of moisture with resultant maceration and excoriation of contiguous surfaces of the skin

Other systemic factors which may cause generalized pruritus but rarely cause true anal pruritus are *jaundice diabetes mellitus* and *allergy* Allergy will be discussed under local causes because it is usually related to some local medication to which the patient is sensitive Ovarian dysfunction has been considered a cause of anal pruritus in a few cases and in some instances estrogenic therapy gives remarkable results

Once it has been determined that a systemic factor is the main or contributing cause of anal pruritus treatment is obvious and nothing more need be said about pruritus of systemic origin

Local Causes—Many local factors may be considered directly causative of or at least contributory to anal itching and all the factors to be listed below account for an additional 25 per cent of the cases of anal pruritus I wish to emphasize that elimination of a perineal draining sinus with its resulting moisture does not necessarily banish anal itching In other words although one of the few unequivocal statements that can be made about anal pruritus is that associated local pathologic processes should be eliminated the fact remains that the functional element enters into most cases

Factors which usually are considered to be local causes of anal pruritus give rise to conditions which can be considered *surgical* or *nonsurgical* as follows

The surgical conditions include *hemorrhoids, ectropion of mucosa* (Plate 61) or *mucosal prolapse, perianal draining sinuses,* such as a fistula or the sinuses of pilonidal disease anal fissure or anal scarring anal cryptitis and anal or perianal *condyloma acuminatum*

The nonsurgical conditions include *psoriasis seborrheic dermatitis pinworms, fungous infections,* local allergic states (such as *dermatitis venenata*) *poor anal hygiene overtreatment* and *anal pruritus after antibiotic therapy*

Psychic Causes—This is an involved subject consideration of which will be postponed for the moment

Diagnosis and Treatment of Anal Pruritus Arising From Local Causes—In general diagnosis of the surgical as well as of the nonsurgical conditions is accomplished after general and proctoscopic examination Also special examinations are ordered as they are indicated they will be discussed as each local cause is taken up

Surgical Conditions—As was stated briefly above *one of the few unequivocal statements that can be made about anal pruritus is that if there is a coexisting moisture producing pathologic condition which is susceptible of surgical treatment it should be eliminated* Some such conditions are prolapsing internal hemorrhoids prolapsing rectal mucosa a scarred anal sulcus or an anal fissure A statement frequently made by patients and sometimes by physician patients is I have itching piles True such a patient may have hemorrhoids with associated pruritus but it does not necessarily follow that removal of the hemorrhoids will relieve the itching Certainly removal of the hemorrhoids is justifiable particularly if they contribute to moisture in the area but the prognosis should be guarded In my experience about 25 per cent of such patients will obtain a variable amount of relief from hemorrhoidectomy However the creation of a smooth anal margin by surgical methods will facilitate anal hygiene and thus benefit the patient Similar statements can be made in regard to perianal sinuses rectal prolapse scarred anal sulci and fissures or other states which contribute to moisture in the area

Anal cryptitis as a factor in anal pruritus has been far over

rated Actually I rarely make the diagnosis of anal cryptitis If the anal papillae are enlarged or if a drop of pus is seen issuing from a crypt I presume that both the diagnosis of anal cryptitis and the surgical treatment of it are justifiable

Anal or perianal warts (condylomata acuminata) (Plate 65) probably are surgical local factors in anal pruritus These lesions are of variable size exceptionally I have seen them as large as golf balls They are warty or cauliflower like They produce a profuse foul smelling watery discharge and may extend well up on the rectal mucosa They presumably result from inflammation and are best treated by the application to each wart of a 20 per cent solution of podophyllin in ethyl alcohol This application is made after the adjacent normal skin has been protected by a coating of zinc oxide ointment or petroleum jelly The patient is instructed to wash the area with soap and water twenty minutes after the solution of podophyllin has been applied If this is not done severe sloughing may occur A second application of solution of podophyllin may be necessary but it should be delayed until four or five days have passed since the preceding application Even then a second application is permissible only if there is no indication of sloughing

Warts within the anal canal itself warts on the rectal mucosa or relatively large warts probably are best treated by fulguration or local excision with the patient under the influence of anesthesia *The application of solution of podophyllin inside the anal canal or rectum may cause considerable sloughing of tissue in that area because of the fact that the patient has difficulty in removing the podophyllin*

These warts tend to recur In my experience the administration of a fractional dose or two of roentgen rays to the area after the existing warts have been removed is helpful in reducing recurrences This is one of the very few instances in which roentgen therapy is indicated for a form of anal pruritus In addition the patient should be instructed in a routine of local hygiene such as cleansing the area with Hamamelis water (witch hazel water) drying the area and dusting on a drying powder such as zinc stearate

Nonsurgical Conditions—The lower sacrococcygeal zone the

gluteal cleft and the perianal area taken together are fairly common sites for the development of *psoriasis* (Plate 68). This should come to mind particularly if there are psoriatic lesions elsewhere on the body. In the gluteal fold and perianal area because of moisture the characteristic silvery, scaly appearance may be absent. Psoriasis accounts for 2 per cent or less of instances of anal pruritus. Ultraviolet light and preparations of crude coal tar are helpful in treating this condition.

The lesions of *seborrheic dermatitis* usually have sharp margins. They occur in the gluteal fold and perianal area where cutaneous surfaces are approximated. They are tan or yellow and usually respond best to the application of 1 per cent sulfur ointments or drying lotions containing resorcinol. Seborrheic dermatitis accounts for 2 per cent or less of instances of anal pruritus.

Pinworms, although frequently considered a cause of anal pruritus, actually have been a factor in only small percentages of my cases. In pediatric practice or in certain geographic areas the incidence of infection with pinworms may be considerably higher. The possible presence of pinworms should be considered when anal itching occurs in childhood. The tiny threadlike worms sometimes are seen on proctoscopic examination. Microscopic examination of the stool or the use of a cellophane-tipped swab in an attempt to recover the ova however probably yields more positive results than visual examination. Theoretically the infection is self-limited if the cycle hand-from-anus-to-mouth can be broken, but to break it seemingly is very difficult. Gentian violet given in an enteric-coated tablet of 1 grain (0.065 gm.) three times daily before meals for a week has proved effective. After a week of rest a second course should be given.

The role of anal or perianal fungous infections in pruritus ani in my opinion has been far overemphasized. Some authors have written that fungous infections occur in almost 100 per cent of cases of anal pruritus. Although in most instances mycotic infections can be found in scrapings from the area prepared in solution of sodium or potassium hydroxide and studied microscopically, such infection is a superimposed process. Fungicide ointments such as half-strength Whitfield's ointment help only a small percentage of patients. The gross appearance of the peri-

anal skin in the presence of fungous infections is not particularly characteristic since the picture usually is masked by previous treatment or by the insults inflicted by scratching. Fungous infection may be suspected if there is an epidermophytid infection on the feet. An edematous or sodden perianal skin similarly may arouse suspicion of a fungous infection.

Local allergy and dermatitis venenata are forms of contact dermatitis in which the patient is sensitive to some substance applied locally. Usually the substance is an anesthetic preparation for topical application. This subject possibly might better be discussed under the heading of "overtreatment." But in any event the redness and edema of the perianal skin extending on to the scrotum or vulva and the buttocks are of striking appearance. The patients are acutely uncomfortable as a result of intense itching and burning and their management is best undertaken in a hospital. The use of sedative agents and the application of moist packs of 0.5 per cent aluminum subacetate are effective after use of the offending local medication has been discontinued. Antihistaminic agents such as 50 mg. of tripelennamine hydrochloride (pyribenzamine) or of methapyrilene hydrochloride (thenylene hydrochloride) may be of some value.

Poor anal hygiene and overtreatment can best be discussed together. In general the tendency of both physician and patient is toward overtreatment. Many patients will scrub the area with soap and water several times a day. The trauma of this action causes desquamation of the protective superficial epithelium, thus making an already sensitive area much more susceptible to slight irritation. Hence the patient should be advised against scratching, for scratching invariably aggravates the itching. Most patients are aware that scratching entails a penalty of more severe itching later on. Meticulous local hygiene can do much more to produce or aggravate anal pruritus than can poor anal hygiene.

Many patients who do not have local pathologic changes at the inception of the itching yield to scratching or overtreatment and either of these actions rapidly induces local cutaneous changes which in themselves cause itching. If there is a tendency toward itching, cleansing with toilet tissue, sponging with Hamamelis water, drying and dusting on a bland powder such as zinc stearate constitute adequate hygiene.

Anal pruritus which follows antibiotic therapy is of somewhat common occurrence in recent years Generally, the patient says that the anal itching began after or during the oral administration of chlortetracycline (aureomycin) oxytetracycline (terramycin) or chloramphenicol Usually little is to be seen in the anal or perianal area except, perhaps excoriations from scratching but occasionally the picture is very vivid (Plate 69) and resembles ringworm One explanation of this type of anal pruritus is that the Candida organism, a normal inhabitant of the intestinal tract grows more abundantly because the agents which normally inhibit its growth have been eliminated by the antibiotic The itching may persist for several months after use of the antibiotic has been discontinued but presumably the discomfort wanes as the normal intestinal flora is re-established The local application of a 1 or 2 per cent solution of gentian violet is effective in combating candidiasis Mercurial ointments probably are the next most effective agents but they are attended by danger of local sensitivity The use of topical and oral nystatin (mycostatin) is very effective in most cases It may be used topically as a powder or ointment It is generally felt that patients who have candidiasis should be considered to be potentially diabetic

Psychogenic or Functional Anal Pruritus—This condition accounts for 70 per cent of instances of anal pruritus although as has been indicated local causes frequently coexist with a functional element The *diagnosis* is made by exclusion of other factors and by recognition of the psychic factors concerned In my experience the incidence of anal pruritus among patients who have duodenal ulcers or migraine—that is among so-called nervous persons—is striking Patients who have anal pruritus require much of the physician s time It is not enough to write a favored prescription without taking into consideration the general make up of the patient The proctologist dermatologist and sometimes the psychiatrist must co-operate in treating some of these patients Moderation in habits of living will need to be stressed to some of them

Finally treatment of this group of patients can be divided into (1) psychotherapy (2) local applications (3) oral medications and (4) radical measures

Psychotherapy —In my experience the simple assurance that the itching is not indicative of a condition which will be followed by cancer frequently is all that is necessary to relieve the patient s anxiety and also his pruritus Obviously any such psychotherapy has to be attended by painstaking and time consuming elicitation of the history and the performance of examinations The quality of psychotherapy practiced of course varies according to the patient The general practitioner or family physician usually can carry out his own psychotherapy for the condition here considered In some instances however it is wise to call in a psychiatrist

Local Applications —As a rule local measures are combined with psychotherapy and in general local treatment of the nervous person is a process of trial and error The tendency is to overtreat which as has been said may make the itching more severe Certainly local measures at first should be simple such as cleansing the area with a piece of cotton saturated with Hamamelis water drying the zone and dusting it with zinc stearate powder If these measures do not seem to be adequate in controlling moisture the use of calamine starch lotions is indicated Bathing the area with a bland preparation such as is used in the colloid bath is helpful particularly if the skin appears to be sensitive to some previously used preparation

Just as it is true of psychotherapy in general so also is it true of local treatment used as an adjunct to such therapy that it must be adapted to the patient concerned For instance the patient s occupation must be taken into consideration If he travels much or lacks modern bathroom facilities he cannot be expected to follow a routine such as can be expected of those who have little else to do In such unfavorable circumstances the following prescription is of great help

Menthol	0 60
Phenol	4.00
Olive oil	100 00
Liquor calcium hydroxide	100 00
Zinc oxide	20 00

The foregoing lotion is applied to the area of the pruritus after it has been cleansed with Hamamelis water

Dryness of the perianal skin may be a factor after long-continued use of carbolated lotions or ointments In such instances substitution of equal parts of olive oil and lime water for the zinc stearate powder may be effective Sometimes the wearing of a fan shaped piece of cotton moistened with cold castor oil will give more relief than does the mixture of olive oil and lime water Still other patients will be helped by the application of a 3 per cent solution of ichthammol (ichthyol) in zinc-oxide ointment

Numerous cortisone ointments are available under various commercial names If these ointments are properly applied the relief from symptoms which they afford frequently is dramatic

To apply any of these cortisone ointments the patient is instructed to cleanse the area of pruritus with toilet tissue in the usual manner after defecation Then the area should be sponged with Hamamelis water and carefully dried The ointment is rubbed into the skin with the fingertips Some patients seem to manage themselves very well and to be relatively free of symptoms by using the ointment only once a week or every few days The patient is instructed to experiment with it and to determine how often he should use it and yet remain relatively symptom free

So far as I know there are no harmful effects from the use of cortisone in this manner It would be highly improbable that the small amount absorbed would create any adrenal suppression

The exact mechanism of action of cortisone in this instance is unknown but presumably the cortisone ointment neutralizes the inflammatory reaction in some manner

Some patients who at first achieved considerable relief from the use of the ointment will say that it no longer helps them Others will indicate that it aggravates the burning and itching

Oral Medications —Barbiturates may be valuable adjuncts to psychotherapy and local measures Antihistaminic agents such as methapyrilene hydrochloride (thenylene hydrochloride) or tripelennamine hydrochloride (pyribenzamine) have been of some help and should be given a trial The dose of each is 50 mg given one to three times daily The oral use of cortisone has been reported by some to be of value when the pruritus is severe and when everything else has failed It seems to me however that

cortisone should be used only as a last resort because of the possible suppression of adrenal function which may accompany its use The condition herein considered is psychogenic more over the use of cortisone may be attended by undesirable side effects

Radical Measures —Before radical procedures are instituted in a case of psychogenic pruritus it is understood of course that all systemic and local factors have been ruled out and that the usual methods of treatment have not given the patient relief For radical treatment various surgical procedures have been tried with variable results One of these is the Ball undercutting operation Another is the cloverleaf operation which consists of three or four radical excisions of perianal skin strips of inter vening skin being allowed to remain There are several modifica tions of the above procedures all of which afford some temporary relief but of course the nerves eventually regenerate The advo cates of these procedures feel that they do break the cycle of the pruritus that is the perianal itching aggravates the nervous ne s and sleeplessness which in turn aggravate the itching Simi lar advantages have been claimed for tattooing or the injection of oil soluble anesthetic preparations into the involved area

My experience has been limited principally to the perianal subcutaneous injection of a 40 per cent solution of ethyl alcohol The procedure is carried out with the aid of caudal and sacral block anesthesia It is attended by some danger that is slough ing may occur in about half the cases in which it is used and the resultant ulcer may heal very slowly The procedure does have value however and of all radical procedures available it offers the greatest chance of relief

Roentgen Therapy —Roentgen therapy seems to give many patients temporary relief but it is associated with the inherent danger of overdosage with resulting roentgen ray burns (Plate 60) and possible malignant degeneration It is best to leave this form of treatment to an experienced radiologist

Comment —Anal pruritus in most cases is psychogenic or functional However to rule out possible local or systemic causes time must be spent in eliciting the history and in per forming special examinations The tendency for both physician

and patient is to overtreat Once specific local or systemic causes have been ruled out local treatment in general is a process of trial and error

If there is present a local pathologic condition which can contribute to moisture in the area such as a draining sinus or prolapsing hemorrhoids it should be corrected surgically but the prognosis in respect to the pruritus should be guarded If roentgen therapy is used the patient should be warned that if later he again seeks this type of treatment he incurs the danger of receiving an overdose Reassurance that anal pruritus is not a *precursor of cancer and the setting up of a simple definite* routine wherein bland preparations are locally applied will give the great majority of patients relief The use of so-called anesthetic ointments should be avoided because of the high incidence of sensitivity to them[1]

Various preparations of cortisone ointments in strengths of 0 5 to 2 5 per cent have been very valuable adjuncts to the symptomatic relief of pruritus

HIDRADENITIS SUPPURATIVA

Because this disease of the skin when it involves the perianal zone so frequently manifests itself in the form of draining sinuses and because of the differential diagnostic problems involved in separating it from other draining sinuses I chose to discuss the condition in Chapter XXVII

BLASTOMYCOSIS

There is nothing about blastomycosis which would predispose it to occur in the anal or perianal areas I have seen only one patient with blastomycosis cutis on the buttocks (Plate 66) According to Kierland blastomycosis involves other sites on the body more frequently than it does the anal and perianal areas It is caused by the fungus Blastomyces dermatitidis but the source of the fungus has not been determined

Blastomycosis is a chronic cutaneous or systemic or both infectious disease most frequently affecting males a preponderance which is thought to be the result of the more frequent exposure of the male

Gross Appearance—Initially the process appears on the skin as a small papule or pustule which becomes crusted and extends peripherally to form a sharply outlined elevated verrucous or cauliflower like patch According to Ormsby and Montgomery one of the most characteristic features of blastomycosis is the border of the lesion which slopes abruptly from the elevated roughened surface to the normal skin from which it is sharply defined The lesion itself is dark red or purplish red

The one patient with perianal blastomycosis whom I have seen exhibited no evidence of the disease at proctoscopic examination but an extensive perianal and gluteal granulomatous process was described It was suspected that this process was tuberculous It remained for the dermatologists to make the diagnosis by demonstrating budding forms of the Blastomyces organisms with the use of a potassium hydroxide preparation

The lesion progressively healed from the center to the periphery under a course of 150 mg of stilbamidine (isethionate) administered intravenously biweekly for twelve doses

ACTINOMYCOSIS

Actinomycosis is a chronic localized or systemic granulomatous disease caused by two groups of the fungus Actinomyces one anaerobic and one aerobic The organism tends to form chronic abscesses which break down and create chronic draining sinuses Typical sulfur granules (Fig 56) which are tangled masses of the fungus occur in the discharge

Gross Appearance—I have seen three patients who had perianal actinomycosis The condition of all of them had been diagnosed as extensive anal fistula with multiple draining sinuses The involved area in all cases was hard livid bluish or purplish and very tender (Plate 67) The discharge was serosanguineous and thin rather than purulent Clinically it was thought that one of the patients had actinomycosis because of the gross appearance of the discharge and the finding of sulfur bodies in the discharge The other two patients were operated upon for what was ostensibly a fistula but which with the assistance of the pathologist was proved to be actinomycosis

The internal administration of large doses of potassium iodide

and the local administration of roentgen rays have been replaced in recent years by penicillin to which species of Actinomyces are susceptible



Fig 56 Sulfur granule (x205) expressed from sinus of a patient who had actinomycosis

TUBERCULOSIS

Tuberculosis in the anal or perianal area generally is considered to be secondary to a pulmonary focus of the disease As a rule perianal or anal tuberculous ulcers are accompanied by rectal involvement [2]

The disease as it occurs in this area is classified in several categories

Inoculation Tuberculosis —Inoculation tuberculosis includes the primary cutaneous complex seen in infants and children Because of public health measures such as pasteurization of milk this form of tuberculosis is now rarely seen

Tuberculosis Verrucosa Cutis —This form of tuberculosis of the skin is considered to have an origin in a bovine type of tuberculosis Tuberculosis verrucosa cutis similarly is now seen rarely because bovine tuberculosis is disappearing

Tuberculosis Cutis Luposa —This disease also known as lupus

vulgaris also is rare When it does occur it is secondary to tuberculosis situated elsewhere It develops at the anal margin and is soft and relatively painless The center of the nodule breaks down forming a clean-cut ulcer

Tuberculosis Cutis Orificialis—This form of tuberculosis probably is the most common type encountered (Plate 61) Clinically it is an anal or perianal ulcer It is relatively painless The edges of the lesion are undermined and the base is grayish

Tuberculosis Cutis Colliquativa—Another scrofulodermatous type of tuberculosis classified as tuberculosis cutis colliquativa is described but it is uncommon

Diagnosis—Any indolent anal or perianal ulcer which coexists with pulmonary tuberculosis should be regarded with suspicion especially if the ulcer is painless The preparation of smears for detection of the tubercle bacilli histopathologic examination of excised tissue and inoculation of guinea pigs with material from the lesions are necessary to confirm the diagnosis

It is unwise to carry out elective surgical treatment such as hemorrhoidectomy for patients who have active pulmonary tuberculosis because the wound can become infected with the tubercle bacilli In fact many patients who have tuberculous processes in the anal or perianal areas date the onset of their difficulties from the surgical treatment mentioned

Since the advent of many valuable antituberculosis drugs anal tuberculosis and perianal tuberculosis are being seen less often

GRANULOMA INGUINALE

Granuloma inguinale is no longer considered a tropical disease It has been reported from almost every country of the world and is endemic in the southern part of the United States Admittedly my experience with the disease has been very limited principally because of the unselective type of practice that is conducted at the Mayo Clinic Although all races are susceptible to this disease Negroes are predominantly affected

The lesions of granuloma inguinale occur principally in the anal and perianal regions but sometimes they are seen on the external genitalia perineum and cervix

Grossly the lesion appears as an anal or perianal subcutaneous nodule a centimeter or two in diameter This nodule becomes soft and ulcerates and vegetative nodules of granulation tissue form that bleed easily Secondary infection takes place and a foul smelling discharge is formed As a rule the disease is considered to be venereal It is caused by a gram negative intracellular organism Donovania granulomatis known as a Donovan body after the discoverer Charles Donovan

The disease frequently is associated with or is complicated by some other venereal disease Granuloma inguinale in itself will not cause regional adenopathy and it is unlike chancroid and lymphogranuloma venereum in this regard Clinically it is difficult to distinguish it from carcinoma The lesions of one of the patients whom I saw had been diagnosed as probable basal-cell epithelioma Removal of a specimen of tissue for biopsy was necessary before the correct diagnosis could be made

Antibiotic agents such as streptomycin chlortetracycline (aureomycin) and oxytetracycline (terramycin) have been reported to give excellent results

HEMANGIOMA

Hemangiomas sometimes develop on the gluteal area In this location they are subject to considerable trauma from sitting Consequently bleeding is the commonest symptom of this type of lesion and at times it may be alarming The bleeding is caused by rupture of the newly formed blood vessels Although some hemangiomas may continually and slowly increase in size as a result of the newly forming blood vessels most of them remain static They are not considered to be malignant The lesions will vary in size and may be associated with lymphangiomas and have a bluish purple cast (Plate 75) which makes them difficult to be confused with any other condition They are best treated by excision or the application of radium The cosmetic result is not an important consideration in this location

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